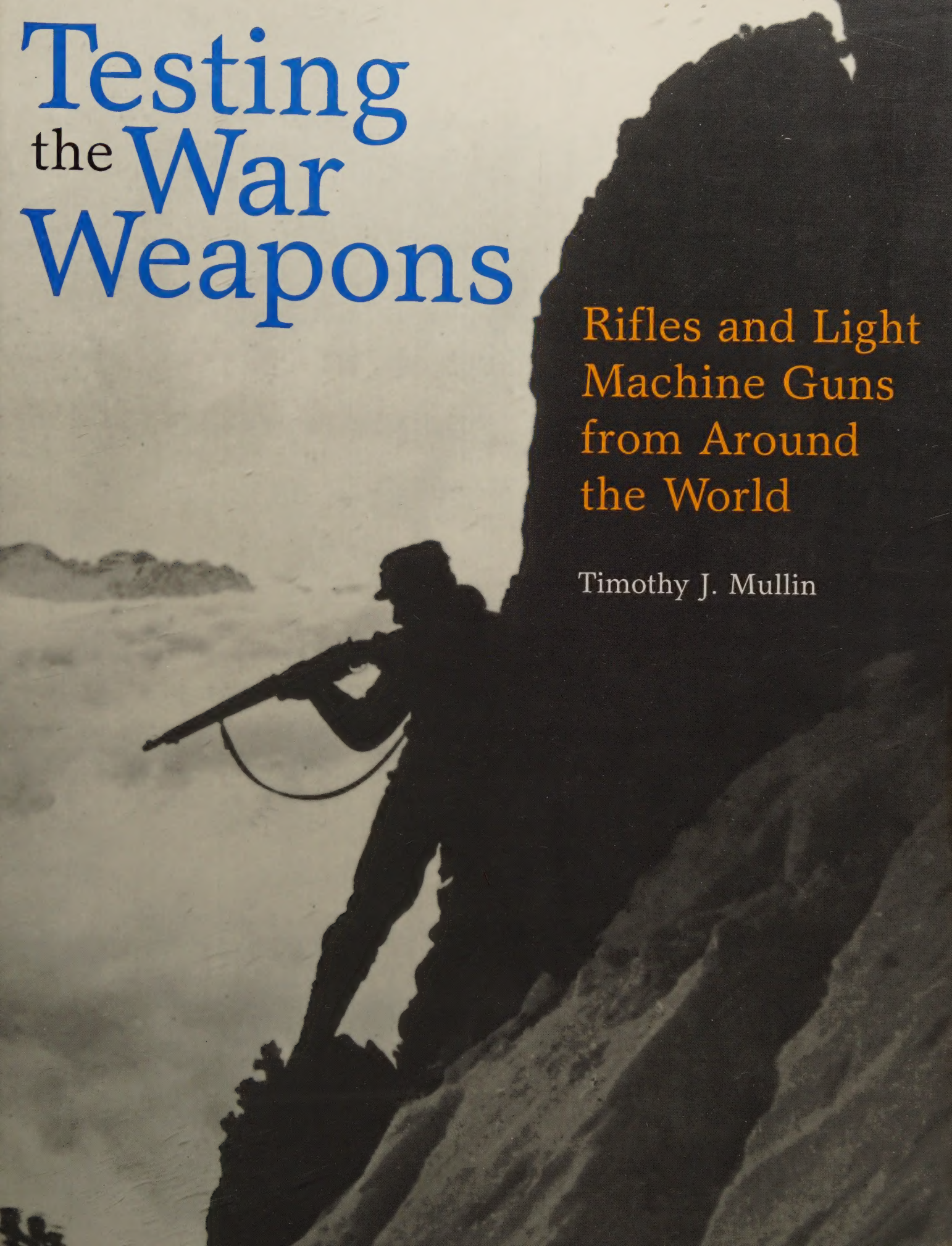
Testing the War Weapons

Rifles and Light Machine Guns from Around the World

Timothy J. Mullin



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To my two best girls, Eleanor and Catherine, both of whom are blessings granted to me.

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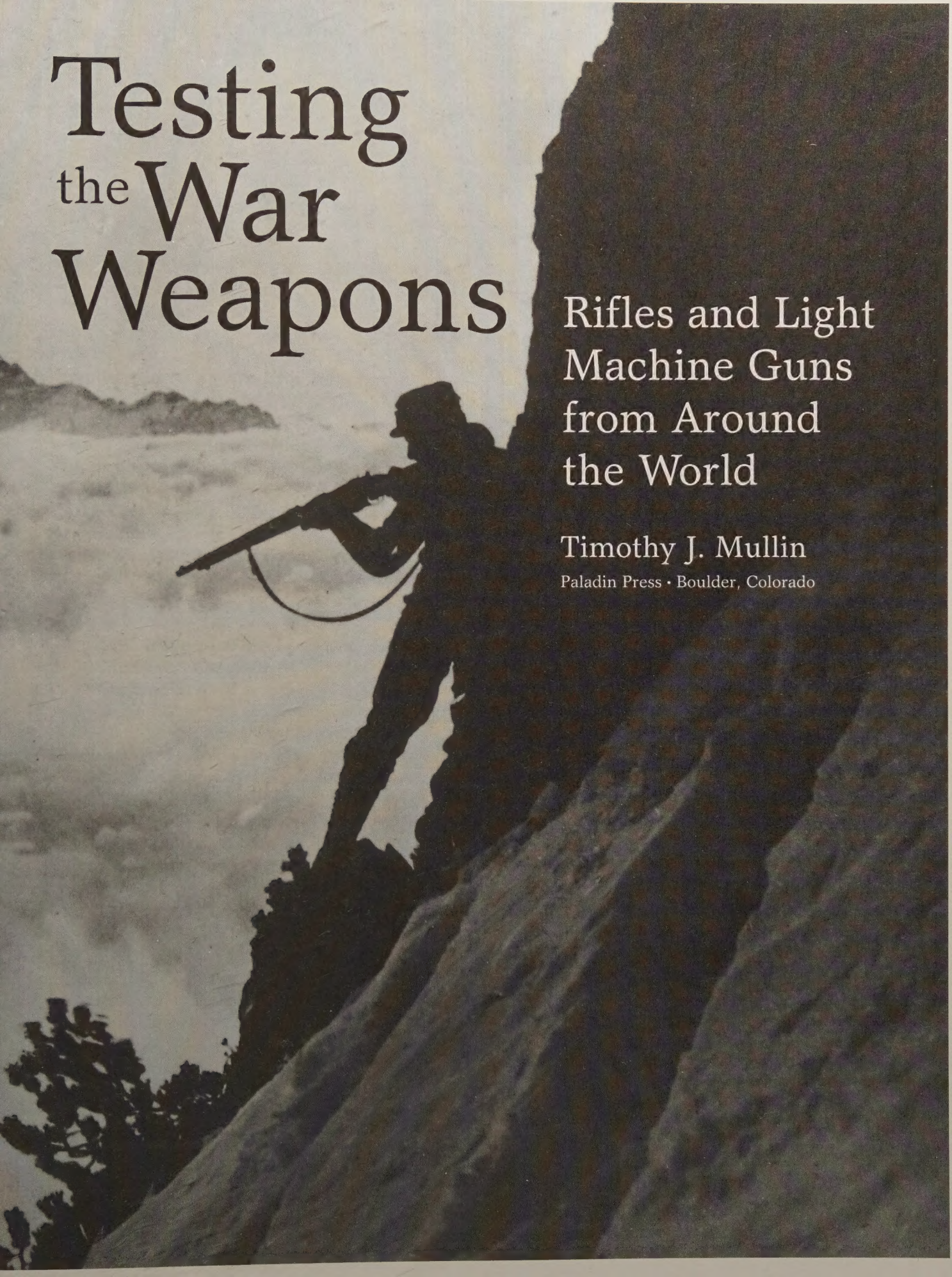

Timothy J. Mullin

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Testing the War Weapons:
Rifles and Light Machine Guns from Around the World
by Timothy J. Mullin

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Foreword

When Tim Mullin set out some years ago to test the pistols for the first work in this series on war weapons, *The 100 Greatest Combat Pistols,* I thought the idea was excellent. I enjoyed the opportunity to assist with the tests and, thus, got to handle and fire many weapons I had not encountered before. *The 100 Greatest Combat Pistol* has already become a standard reference work for those in ordnance intelligence and weapons identification, as well as for those of us who are just interested in firearms history and development. This second volume, which deals with rifles and rifle-caliber light machine guns, makes an excellent companion to *The 100 Greatest Combat Pistols.*

More than 150 weapons are covered in this work, many of which have stood the test of time quite well. I must admit that I was not present at the testing of every rifle covered herein, but I was there when at least half of them were tested, and I can state unequivocally that Tim Mullin did not stint in giving them the most thorough and practical tests he could devise. One of the factors that should make this work especially valid is that Tim is a former infantry officer. There are too many "arms experts" who have never carried a rifle all day through mud and up hills, into and out of APCs (armored personnel carriers) or choppers; therefore, their views of what makes a good battle rifle are often irrelevant. Whether it is the Krag bolt-action rifle or the FAMAS bullpup, Tim Mullin examines the rifle from the point of view of a grunt. He wants to know if at the end of a long day, he could easily maintain the weapon while still retaining enough energy to open a C-RAT or an MRE (meal, ready to eat), to figure out where he is on a map, and then try to get his platoon's radio to work. Last of all, he wants to know that, when he finally can doze off, he'll be confident in the rifle lying next to him. This is not a mere picture book with photos of the rifles, the same one-paragraph design history you've read dozens of times, and cold statistics. Development, history, and statistics are present in this work because it is for reference, but the real core of this work is the evaluation of the weapons based on field testing.

I think this is a very practical work, too, for those who remember that this has traditionally been a country of riflemen and riflewomen. Many of the rifles evaluated in this book are still available at quite a reasonable price on the used-gun market. A perusal of these evaluations may help those wanting an inexpensive yet viable rifle make a well-reasoned choice. The work is also invaluable in that many weapons most readers are not likely to encounter are tested, tested in a way that makes one feel as if he is on the range discussing the weapon's characteristics with Tim Mullin. I found certain tests especially interesting. When we evaluated the Accuracy International PM, for example, it brought back memories of a visit to Hereford some years ago when a friend of mine, who was in

the SAS Ops Research Unit, was evaluating this rifle. He waxed eloquent about its accuracy, but only on the range with Tim Mullin did I finally truly appreciate what he meant. Likewise, I was overjoyed to finally get a chance to test the British SA-80 and the French FAMAS, the two bullpups that saw action in Operation Desert Storm and have been pictured in use in Bosnia. Like many, I was initially skeptical of bullpup rifles, but actually shooting these rifles makes one view them much more sympathetically.

As with *100 Greatest Combat Pistols*, I think most readers will first read this work from cover to cover and then put it on the reference shelf to pull down whenever questions arise about a specific weapon. I've probably said enough by now; I know you want to start reading this excellent work, and, to be honest, I want to meet Tim Mullin to give him this introduction and shoot some of the submachine guns he's testing for the next volume in the series.

—Leroy Thompson
St. Louis, Missouri

PART I

Introduction

The Need for This Book

When I originally got the idea for a test book, I thought I would test military-style handguns and compare them with something everyone is likely to have tried (a K-frame Smith & Wesson .38 Special), so that even if you had never fired some foreign weapon, you could get an idea about how the weapon would actually work. I also wanted to know how they worked as combat weapons, not as a remote-control paper punch, so I shot each of them on a police cinema range. This proved to be very helpful in properly evaluating the weapons because some handguns that appear good on a formal range turn out to be bad when used in combat scenarios, and others that seem bad on a formal range turn out to be excellent in combat scenarios.

The whole project got to be very interesting and, I hope, useful to somebody who needs to have practical, real-world information about obscure weapons. It also was fun to try to find the weapons, some of which were very hard to locate; get the ammunition, some of which had to be made; photograph the weapons in some interesting way that shows them being shot to establish that I really did fire the weapons, unlike some gun writers; and, last, to get at least one period photograph showing the weapon in use. The project grew steadily until I had personally fired and evaluated more than a hundred military handguns. I do not think anyone else has ever fired all of the weapons tested, so it gave me a unique position and point of view for my evaluations.

As I got close to finishing the handgun book, I cast about for my next project and decided that I would cover rifles, sniper rifles, and light machine guns in my next volume.

I began work at once because I discovered that as a result of the constant restrictions being imposed on the free exercise of constitutional rights, it was getting harder all the time to locate the weapons and be able to test them in the proper fashion. Had I started the project five or ten years earlier, it would have been substantially easier to locate the weapons. Still, I went forward with my search and evaluation.

By good fortune, I met Noel Schott of Belleville, Illinois, who was kind enough to lend me, with no restrictions, any weapon from his wonderful military rifle collection. This allowed me to cover many more rifles and to do so at a much faster pace than otherwise would have been feasible.

Similarly, Kent Lomont became interested in the project and was able to locate some weapons for testing and evaluation that otherwise might have been either impossible or, at a minimum, very difficult to obtain. John Ross, my good friend, likewise made his wonderful Class Three collection available to me without restrictions, allowing me access to many weapons that would otherwise not have been included because of the cost and difficulty in obtaining them. Last, my friend, Leroy Thompson, as with the handgun volume, exchanged ideas, helped take photographs,

and basically allowed me to talk endlessly about military rifles, a subject, I fear, that really was of little interest to him.

Other people who contributed by either supplying weapons, information, or a willing ear to listen about my latest project include Martin Floyd, Chief Edward Seyffert of the Cave, Missouri, Police Department, John Miller, Tom Knox, and Shawn McCarver. I wish to express my thanks for their efforts and support.

When I got the rifles in to test, I wanted to test them as they would be used by an infantryman. I am not concerned about design features, except so far as they make the weapon either easier or more difficult to use in combat. I do not care for firearms as engineering examples but only as weapons to be used by men in combat against other men. This is the way I sought to test and evaluate them. Information about their design features, method of manufacture, and field-stripping techniques can be obtained through lots of other books. Only in this book will you be able to read how they work when tested as combat weapons.

I tried to fire some groups from a rest with each rifle, and then having determined generally at least what a common example would do, I evaluated it from the off-hand, kneeling, and sitting positions. Generally I shot the rifles at 200 yards in the off-hand position and 300 yards for the kneeling or sitting positions. Prone shooting was reserved for 480 yards and 565 yards. Generally I would fire about 100 rounds through each rifle, and I tried to always use military surplus ammunition. Through some rifles I fired a lot more rounds; occasionally I limited myself to 50 rounds when ammunition was scarce. After the bench testing to determine accuracy and zero, I would go to the other positions for evaluating the rifle. I always included a rapid-fire drill where two complete loads had to be shot rapidly, for this forced me to consider problems with reloading a hot weapon.

Although I did not have access to a cinema range on which to shoot the rifles, I did have the opportunity to shoot the rifles in such a way that I believe enabled me to properly evaluate the weapons as infantry rifles. Additionally, I tried to carry the rifles long enough in the field so that I could pick up at least some idea of what the infantryman who had been issued the rifle would feel when carrying the rifle on active service. Ideally, I would have lived with each rifle in the field for a week or more, taken it on night patrols, crawled through the mud with it, and sat in a hole with it while shells dropped around me, but that type of testing is beyond my ability to deliver to my readers. However, because I have tested some rifles that way in the past, I think I get at least some idea of what other rifles are like under the circumstances. Although I do not claim that my testing methodology is perfect by any means, I do believe my evaluations are the most realistic you are likely to get about the rifles discussed in this work. I base this statement on the fact that my evaluations were made by me, a Vietnam-era infantry officer, who used M14, M16, and XM177E1 rifles in the field, and that long ranges and cold weather were not something I encountered in the army. However, my hunting trips have given me experience in long-range and cold-weather work, so I believe I can relate to these problem areas.

In selecting the rifles to be tested, as with the handguns, I tried to pick honest standard examples. Some rifles tested were virtually new, even though more than 75 years old; others were new out of the box; and some were well-worn veterans. However, all were functional, in good repair, and had clean, good bores even if the finish was worn. No weapon was tested that would not have been suitable for issue to a soldier during wartime. As a result of some difficulties in getting weapons, semiautomatic variants had to be tested for such selective-fire battle rifles as the SIG STG 90, FAMAS, and L85A1; however, because I do not think hand-held fully automatic fire is effective, I do not believe I lost anything in my evaluation or that the reader will get a false report or evaluation.

As in the handgun volume, I have grouped the weapons by country and in approximate order of their appearance on the battlefield. Naturally, there are many rifles that were introduced or made in one country and used widely elsewhere, but I believe the grouping I use is convenient and helpful. It was also interesting to see how certain developing trends unfolded and how the various, and varied, military forces formed their own views of what is important and what is to ignore.

All of those who collect or shoot military rifles should find much of interest here. But, more critically, those who may be called upon to actually use these weapons in combat in some distant place (or perhaps closer to home if certain unfortunate anti-liberty trends continue) will be able to see what good and bad points exist, thus minimizing the bad and making best use of the good. I hope they will also discover which is the better weapon to pick if confronted with a selection. I have found that, as with handguns, some rifles thought to be bad are actually quite good, while others long thought to be fine weapons are actually much less efficient than they appear until they receive a thoroughly practical evaluation.

Military Role of the Rifle

When evaluating rifles, the issue that must be dealt with is what tasks they will be assigned. Over the years, this has changed, with less being expected of a rifle of the 1990s than was the case in the 1890s. As a consequence of this change in expectations, a rifle's ability can be changed without destroying its efficiency. Thus, many things that were necessary to achieve old goals can now be omitted, and other things can be added that would have hampered the old required performance but will now actually improve the rifle's ability to do the more limited job currently expected of it. It is hoped that the performance of the individual soldier will improve accordingly.

A word about the individual who shoots the rifle. Except for a brief period and a few rare places, I do not think the soldier of today is a worse rifleman than his 1890s' counterpart. Certainly, today's untrained urban dweller is not going to be any worse a shot than yesteryear's untrained villager of limited education. Now I am not talking about the Boer farmer who was raised to shoot from an early age nor the American frontiersman of the post-Revolutionary/pre-Civil War era. Such an individual would have come to the military with a great ability. Nor am I talking about the hard-core shooting enthusiast who comes to the military already trained in accurate rifle shooting or whose experiences in the hunting field are better than any "scout training course" offered in the world. Instead, I am speaking of the typical enlistee in any army of the world in the past 100 years.

What tasks was a rifle expected to perform in the 1890s that are no longer required? In the 1890s, the machine gun and mortar were in their infancy. Airplanes and helicopters did not exist. Artillery was cumbersome and rarely close enough to offer anything in the way of close-range support. Communications were very difficult, performed by messengers or signals in the main. The rifle was used as an indirect-fire weapon. Where today we would use a machine gun to saturate an area, in the 1890s a platoon of soldiers firing in unison with their sights adjusted for 1,500 yards did the same thing, and to an extent achieved the same effect. Today, we use a mortar to reach over a hill that shields the enemy from direct fire; in the 1890s, with the high trajectory of the cartridges of the day, the rifleman could adjust his sights to shoot over the intervening hill and rain bullets down on the heads of his enemies.

In the 1890s, the cartridge capacity of rifles was lower, and metallurgy was a sometime thing. Stuck cases were common. Resupply was not a helicopter trip away. In the much more organic society of the 1890s, many of the chemicals that we today take for granted did not exist. Consequently, larger bores were required to burn the powder charges to get a velocity that was, however, much lower than what we accept today. Making a rifle into a deadly pike by affixing a

bayonet to the muzzle was normal: the longer the bayonet, the better—it allowed a soldier to reach that much farther toward his enemy. Additionally, because horses were common in military operations in the 1890s, forming a wall of gleaming bayonets could force mounted adversaries to have second thoughts.

Today, the soldier with a rifle is still the most important element on the battlefield, but he is backed up by a number of things that make his duties fewer. The machine gun and mortar have made the battlefield much more deadly than before, and have also usurped the position of the rifleman in delivering long-distance and indirect fire. Better chemicals have allowed the development of lighter weapons and increased velocity to a degree that shorter-barreled rifles are acceptable. Rapid resupply allows the soldier to shoot more rounds faster without fear of running out of ammunition. Today, the bayonet lug still exists on rifles, just as the appendix exists in the human body, merely as a memory of days long gone.

The individual soldier of today is required to shoot at individual targets. His targets will be moving, wearing camouflage, often operating behind smoke or at night, and are not as easy to hit as the more colorfully clad soldier of 1890. Hitting such targets rapidly, even for an expert rifleman, at 400 to 600 yards is very difficult. A basically untrained person, who has received his only rifle training at government expense, is lucky to hit them at half that distance.

Because the tasks for the riflemen have been reduced, the ranging ability of yesterday's rifle in both its sights and cartridge can be changed. If you will never hit beyond 400 yards, then you do not need sights calibrated to 2,800 yards. If you do not need the power beyond 400 yards, why shoot a cartridge that will still strike a disabling blow at 2,800 yards? If you can burn the powder in a shorter barrel, which is easier to get in and out of doors and vehicles with, why not have it? If you do not anticipate having a case jam in your action, or reloading being very slow, or resupply difficult, why make your rifle into a pike?

Perhaps the best example of how this has developed over the past 100 years is in comparing the U.S. M1873 Springfield 45/70 ("Trapdoor") with the Austrian AUG 5.56x45mm. Both are good rifles. Both will shoot the same-size groups at 100 yards in the hands of equally skilled shooters. Both will kill or disable a man with a well-placed shot at 300 yards. The soldier of the 1890s, if trained with the AUG, could do as well as a modern soldier; we know this to be true because the modern soldier who has trained on the AUG can be trained to shoot the Springfield Trapdoor effectively. But we have only to compare them side by side to see how the tasks each rifle can perform are different. You can do certain things with the Trapdoor that simply cannot be done with the AUG. Don't believe it? Try shooting over a hill 600 yards away and hitting people hidden behind it. Try hitting a crossroads at 2,000 yards and denying it to the enemy. Do a quick bayonet thrust and butt stroke with your AUG and see what's left of your rifle. On the other hand, the Trapdoor can do everything the AUG can do, albeit at a slower pace. We assign fewer tasks to our rifles today. As shooters, we really are not any smarter generally, are only marginally stronger in a general sense, and are certainly not any braver than the 1890s' soldier. It's just that he had to perform more tasks with his rifle than we do today with ours, and so it was made certain that his rifle was capable of those jobs by including features that are no longer needed.

Effective Range of the Rifle

When discussing the effective range of weapons, we must first decide what we are talking about. Many claim that the effective range of small arms is measured in the thousands of yards for which the projectile fired will prove deadly. However, it is not a mere lottery we are talking about: the damage done to the individual struck must be intentional. The shooter must have intended to hit the injured party, and the resulting damage must be something that could reasonably be expected. It is not enough that the person was hit—the likelihood of hitting him must have been good enough to merit the cost and effort it took to fire the shot in actual combat. Occasionally, there may be shots taken with only the wildest hope of connecting, but those must be few in number. Usually when people fire they intend to hit the target, and it is only lack of skill or defective equipment that keeps it from happening.

Thus, effective range will vary with the cartridge fired, the weapon used, and the shooter employing the weapon. A skilled person can hit things at a greater distance than one who is ill trained; skill is essential, but even the most skilled person using inferior equipment may not do as well as a less skilled individual with better equipment. Here, an example may better illustrate my point: an excellent marksman with a buckshot-loaded shotgun cannot expect to hit a man-target at 200 yards, whereas an average shot with a good scoped rifle and good ammunition can easily do it. In another example at 200 yards, take an inexperienced shooter with a rifle and an excellent shooter with a pistol. The expert will do as well or better than the inexperienced shooter at 200 yards even though it is more difficult to hit distant targets with a handgun. A third example: take two shooters of equal skill, one with a light machine gun and the other with a pistol at two yards on a quick-reaction course. The light machine gun may have a greater power level, but the pistol shooter is more likely to hit the target more quickly under these circumstances.

If the individual using the weapon is trained, in good condition, and familiar with the weapon at hand, the effective range will be longer. Ill-trained individuals with the same weapons will always have a less effective range. For this obvious reason, the better trained and more experienced the shooter, the longer the effective range a given weapon will have. However, the problem lies in acquiring the training and experience. In my experience, most such training and experience will not come from government-supplied training. The effective shooter, whether military or police, tends to be one who is interested in shooting as a hobby before or during his time in the organization and will devote his own time and money to mastering the equipment. A government may supply weapons or ammunition not otherwise available to the shooter, but it will never give the shooter adequate training or motivation to really learn the weapon. At

best, a government will provide opportunities; under less than good circumstances, it may actually block the actual mastery of a weapon by a soldier or peace officer.

It must also be taken into account that as conditions get worse, performance will decline. Poor light, excessively cold or hot weather, rain or snow, fatigue or sickness will all affect performance in the field. An excellent shot who is cold, tired, and sick is unlikely to do as well as a comfortable, rested, healthy, ill-trained shooter. I have shot on days when it was so cold that I, bundled up like a bear, could hardly touch the trigger, and when it was snowing so hard that I could not see the targets beyond 200 yards—and they were painted orange. My performance obviously was not as good as when I was comfortable. Returning from Europe recently and suffering from jet lag, I was so tired that I could hardly hold up my pistol, much less shoot my normal groups with it.

We also must bear in mind that our human targets would be difficult to see, have no clear firing mark on them, and often be moving. They would be doing everything possible to avoid being hit, from filling the air with smoke to using cover or body armor to make it difficult to get a bullet into them. While acknowledging all these variables, we still can, I believe, have some basic idea about effective ranges of various weapons. By doing that, we can then decide which weapons are truly effective for their intended use and which are not.

Shotguns are our most limited weapons. Ignoring the possible use of slugs, which I do not believe are very effective (you get only a single short-range, high-recoil projectile), buckshot simply will not consistently hit man-size targets at 100 yards. Given the low penetration and size of shot patterns, 50 yards is really a more logical, practical effective range. I know that sometimes you can do better and sometimes you will not get any hits at that distance, and even light cover will defeat buckshot at such distances, but still I believe 50 yards is a fair effective-range figure.

Handguns are more difficult. For the skilled shooter who has a good weapon and ammunition, plenty of time, and a rest position, a handgun can place targets on a man-size target at 600 yards. Although that is truly "straining the six gun," in my experience it is no trick to hit a chest-size plate at 300 yards 50 percent of the time with a good service-quality self-loader or revolver. It is equally true that many people will miss at 10 feet when they shoot at targets with a handgun. I think the number of real experts, who can hit a man target at 600 yards, is very low. Similarly, the likelihood in today's world (unlike the Frontier of the 1870s) of a target standing out in the open on a dusty plain waiting for you to shoot must be low. The world is full of incompetents, but we should not think they will be given a handgun, which is typically an emergency weapon to be used only when something better is not available. All these factors taken together make 50 feet the truly practical range of a handgun.

Submachine guns (SMGs) use the same ammunition as handguns. Of course, the power of SMGs may be slightly higher because of slightly greater velocity, but the real benefit comes from ease of shooting. Because you can place the SMG's butt on your shoulder to steady it, the gun's ability to deliver accurate rounds at a distance is improved. Offsetting this, however, is the open-bolt feature found in all but a few SMGs. The jar felt when the bolt is released renders fine work, such as what you can do with a rifle, much more difficult. Thompson SMGs of the M1921/8 type have adjustable sights calibrated to 600 yards. I have never shot my Thompson M1928 SMG at 600 yards, but firing from the kneeling position with it I have hit chest-size plates at 300 yards, so I know it is possible to do so at least 75 percent of the time. I have had a similar experience with my H&K MP5 SMG; I have hit the plates at 300 yards but found it difficult to score at 450 yards, mainly because of the lack of sight adjustments. I encountered a similar problem with my M37/9 Suomi SMG. I could hit at 300

yards without difficulty, but given the high trajectory of the 9x19mm cartridge and lack of adjustment available in my sights, 450 yards was very difficult. It must also be recalled that SMGs shoot only pistol cartridges; hence, as distance increases, the ability to penetrate cover is very low. This can be overcome to some extent with steel-core ammunition (such as I fired at a 55-gallon steel drum at 300 yards with my 9x19mm SIG P210 pistol, finding that the round would go through one side and deeply dent the off side but not penetrate it). But with standard ammunition, penetration is very limited, especially in contrast to any rifle cartridge.

Also, SMGs can be shot in bursts or in a self-loading-only mode. When fired in bursts, I believe an SMG to be more like a shotgun because of the patterns typically fired. Although it is possible that you will keep a burst on a target at 200 yards, it is not likely. A well-trained shooter using a really good SMG, such as the Owen, can keep bursts on a man-target at 50 yards, but with lesser equipment and shooters 25 yards is about the effective range of the SMG on burst fire. Used as a self-loading carbine (really the way the SMG should be viewed actually and used), I believe that open-bolt guns are typically effective, all points considered, out to 150 yards and closed-bolt guns perhaps to 200 yards. The cartridges are not any more powerful, but the guns are easier to shoot at a distance.

Standard rifles get us into some greater power ranges. Rifles can vary in this power level from the German MP44 in 7.92x33mm or M1 carbine to the M98 Mauser with specialized 7.92x57mm ammunition or its U.S. equal, the .30-06. As for sniper rifles, some calibers at the low end start encountering the same high-trajectory and low-penetration problems already discovered in handguns and SMGs. Those at the other end of the scale are capable of dealing hard blows at more than 2 1/4 miles.

The main problem encountered when we get into rifles is seeing the target: the ability to discern small changes in sight adjustment and calculating distances. At ranges at which the SMG is effective, seeing targets is relatively easy (depending on vegetation, of course), and no real concern need be given to cartridge trajectory. Even discerning the small changes in sight adjustment is not too critical because the targets are large, the distance short, and the sight radius fairly long, at least in comparison with a handgun.

In my experience, seeing targets is a function of training and luck. If targets move, they can be more readily spotted, so a lot will depend on the enemy. Calculating distances is likewise a matter of skill, which can be learned, and luck (or instinct). The more frequently you get an opportunity to guess distances and then measure them, the better you will get. Some things, of course, are harder to guess than others. Guessing in deserts or over water, where there is nothing to compare the target with, is harder than guessing in the city where a lot of objects of known size exist.

How important the skill is depends on the cartridge trajectory. The cartridge that shoots flatter will always do better at unknown distances because the consequence of a mistake is less critical due to the lessened drop rate at distances. Of course, to get that flatter trajectory, you have to either increase the power of the cartridge—hence, size of cartridge, weight of same, and recoil—or reduce the effectiveness of the bullet on target by making it smaller and lighter so that the same amount of powder will throw it farther. That, of course, ultimately results in less impact on the target.

The most difficult part of this equation comes from discerning small changes in alignment of the sights. The angle at which the sights are out of adjustment stays the same, but will produce increased inaccuracy the farther out you are shooting. Therefore, the less the angle of adjustment is off, the better the likelihood of hitting the target. Discerning these small changes and correcting for them involves both a technical issue and personal experience. Simply put, with some sights it is easier to see that their alignment is wrong than with others. When you can see that the sights

are out of alignment, you then take the necessary steps to get them back into alignment.

Different people find that different sights are easier or harder to use. I find that European-style V-shaped rear sights and pyramid front sights are very difficult for me to use effectively. With such sights, I am lucky to get 3-inch groups at 100 yards, whereas with the same rifle using a peep rear, I can shoot into 1 1/2 inches. A rifle with a 3-inch group at 100 yards will miss a 10-inch target at 400 yards frequently, whereas a rifle with a 1 1/2-inch group will hit the same target at 700 yards. Some battle rifles, such as the AUG and L1A1, now come with scope sights. Both of these scoped rifles allow the shooter to see targets and discern sight alignment more easily even though the rifles may not be any more accurate, judgment of distance any better, or the cartridge any different.

Discerning misalignment of the sights is one aspect of the problem, but the other is correcting for it. With a rifle, the mere fact that you are holding it says that it is moving into and out of sight alignment by virtue of your breathing in and out. Similarly, when you pull the trigger, that action tends to pull the weapon out of the perfect alignment pictured in the manuals. The better the trigger, the less likely it is to shift the weapon out of alignment while being pulled.

Some weapons are easier to shoot than others. The H&K G3 for instance has a terrible trigger pull, and keeping proper sight alignment while pulling on the trigger is not easy. On the other hand, some rifles have such good triggers that merely "wishing it to go off" seems to do it.

Taking all these factors into consideration and looking back at all the military weapons tested, I must conclude that 300 yards is about the effective range of infantry rifles. That does not mean that a good shot cannot hit a 10-inch plate at 600 yards with a standard military rifle (I have done it with many different rifles of the type tested over the years), but that is rather like hitting a plate at 300 yards with my handgun. I have done it, but I doubt that such work is typical. I believe that 300 yards is a fairer representation of a truly effective combat rifle range.

With this in mind, certain factors such as calibers, length of weapon, style of sights, and weapon systems must then be evaluated to determine whether the weapon is truly effective or whether it has things that are superfluous to the shooter's needs, or even detract from the weapon's performance in the field.

Squad automatic weapons (SAWs) are typically fired from a bipod, although some can be fitted into a tripod, as are larger machine guns, and some are light enough to be held and fired like a rifle. But, still, they are typically fired in the supported position. Also, SAWs fire from an open bolt generally (the RPK being the major exception), and this system will limit fine accuracy. They are also commonly fired in the burst-fire mode and can be alternatively viewed as a long-range shotgun in that the weapon is intended to throw out a pattern of bullets into a given area to increase the likelihood of hitting a target. Commonly, such targets are indistinct, or there are multiple numbers of target opportunities in a given location. The sight problems associated with rifles are the same as before, and the open-bolt firing mechanism makes fine control to maintain sight alignment even more difficult. To counteract this, we have the stabilized firing platform and burst of projectiles, which throw a cluster of bullets at a given area. These two aspects allow for a greater effective range than would be feasible with a conventional rifle, but as you fire farther out, lack of penetration into cover becomes a problem in some weapons. The weapons that use 7.62x39mm or 5.56x45mm cartridges have less power at extended ranges than the 7.62x54R, 7.92x57mm, .30-06, or similar weapons. You can use "trick" bullets to an extent to overcome this, as the 7.62x39mm and 5.56x45mm both do with their steel-cored ammunition, but if you compare similar trick ammunition for the former calibers, they will outperform their smaller brethren.

After extensive testing and evaluation, as

well as much consideration, I conclude that the effective range of the 7.62x39mm and 5.56x45mm guns is 500 yards, and add 50 yards for their longer brothers.

A light machine gun (LMG) typically weighs more than a SAW, fires longer bursts, uses some type of spotting ammunition (e.g., tracers) to help sight adjustment, and is always fired from a supported position. Except as a stunt, I cannot hold LMGs up offhand and shoot them. I can shoot them from the kneeling position, but I can go into prone just as fast with better results and, except for firing an M60 off an Asian's shoulder one day when the grass was too high for me to see my intended target from the prone, I have always shot them off bipods or tripods. With a bipod, the weapons are only slightly better than a SAW. They are heavier and jump around less, which tends to concentrate the cone of fire, but even so I do not think this gives you more than 150 yards extra range, if even that. I think the bipod-mounted LMG has an effective range of 650 to 700 yards depending on the gun. The slower the cyclic rate of the weapon, the more effective it is.

When you mount it on a tripod, however, and add a proper installation, the LMG can become truly effective at great distances. Now merely sticking the weapon in the tripod does not make it properly mounted. Some people fail to mount it properly and fail to install the pintle, or some fail to dig the feet of the tripod down. Even when the feet are dug down, some fail to load sandbags on them. But if your mount is tight, you dig the feet in, and you sandbag the whole thing properly, you greatly improve your effective range.

During World War II, German troops effectively used tripod-mounted MG 34/42s at ranges of 3,800 meters. They had a good mount, excellent tracer and armor-piercing ammunition, good crews, and enough of the Soviet Union to their front to do it. Most times, you will not have this combination of factors, but it shows what can be done. Even if all these ideal factors are not present, as long as you use the weapon and tripod properly and have a good spotter, a 1,500-yard effective range is perfectly reasonable to expect. Thus, you more than double your effective range with the tripod—something to think about if you are an infantryman wondering why you are burdened down by this heavy, awkward object that pokes into you at every opportunity when you carry it on your back.

Determining effective range becomes very critical in properly evaluating weapons. What we always look for in weapons are qualities that will achieve our goal with the minimum amount of weight, maximum amount of reliability, and greatest ease of operation. If we know what we expect of it, then we are in a proper position to determine whether a given weapon is better or worse than others that are similar. Additionally, it will help in finding better solutions in the future if we realize what we are really looking for a given weapon type to achieve. This is why determining the effective range of a weapon is so important.

What Is Needed in a Sniper Rifle?

All too often, rather simplistic answers are given to the question about what is needed in a sniper rifle. To some, merely installing a telescopic sight is enough to convert the standard rifle into a sniper rifle. Others think that it is not a sniper rifle unless the weapon is long and heavy, with many of the attributes of a match rifle. To such people, sniper deployment is like an extended rifle match. Both views are wrong.

First, we must recognize that the rifle is a very small part of what goes into making a proper sniper. It is perhaps the least important, in fact; quality sniper rifles can be produced in a somewhat uniform manner. Modern technology has made such rifles easy to obtain, even though the same technology makes getting the right human material more difficult. The mental attitude, spirit, and training that made for a good sniper in World War I will make a good sniper today. However, while human potential remains the same, weapon technology has so improved that a modern-day sniper should be able to do things that were not possible for any sniper forbears in the 1914–1918 war.

The training that is necessary to create a good sniper and people who should be selected for the role are well known to anyone who has studied the subject. They are the same no matter what period we deal with or what nation's army we are reviewing. This chapter will not deal with those issues, but rather will concentrate on the rifle and its technology.

ACCURACY

First, any sniper rifle must be accurate. How accurate depends upon the uses to which the rifle will be put. In the civilian police situation, for instance, rare is the shot that exceeds 125 yards, and the target is generally so large that extreme accuracy is not necessary. In the military context, long ranges are encountered. For antipersonnel use, the targets may be small, but when the rifle is used in the antimateriel role—such as shooting at airplanes, missiles, radar installations, or the like—the accuracy requirements are much more relaxed. Although it is always better to have an accurate rifle, we must not allow our quest for accuracy to overshadow our concern for mobility or reliability. For instance, the Accuracy International AW rifle shoots into 2 7/16 inches at 505 meters but weighs 15 pounds. My M700 Remington with its 18-inch barrel weighs less than 8 pounds and will shoot into 2 3/4 inches at 480 yards. I would much prefer the mobility that I get with the Remington to the greater accuracy the other rifle supplies.

RELIABILITY

Second, the sniper rifle must be reliable. Not only must the weapon be capable of firing a large number of rounds without failure, but it also must be able to withstand all the rigors of military conditions. Unlike the police rifle

that will go from the foam-lined metal box of the cruiser or police van to the incident scene, be fired, and then carefully cleaned and put away, the military rifle will be carried in the field daily for weeks, if not months, on end. It will be exposed to rain, snow, mud, baking sun, and all the things that damage military rifles. It will get dragged through the mud, knocked over by a careless nonsniper trooper while the sniper is away for a few seconds (and the sniper will not be told by the trooper who did it), and otherwise abused in bumpy trucks over rutted roads while held upright between the sniper's legs, with the buttplate resting on the toe of a muddy boot that is itself vibrating wildly because of the road.

AMMUNITION

The military sniper works as part of a military unit, and he will not be able to get much in the way of special ammunition or cleaning supplies. If lucky, he may be able to get some match-grade ammunition, but frequently that may prove impossible. The targets he shoots will be wearing ballistic helmets and vests: this unlike what his police counterpart usually encounters. The military sniper must face retribution in the form of countersniper fire by individual riflemen, machine guns, or even artillery. As part of the team, the military sniper may have to fight his way out of ambushes or participate in the closing moments of an attack where rapid firing may well save the day. Thus, to trade the ability to fire a large number of rounds quickly in exchange for the ability to more slowly fire a fewer number of more accurate rounds may not be such a good swap.

What type of accuracy is truly called for in a military sniper rifle? Without reservation, I would say that any decent sniper rifle should be capable of 1 minute of an angle (MOA) with proper ammunition. Really fine examples should go 1/3 to 1/2 of an MOA, but nothing less than 1 minute is acceptable. However, the rifle must keep this accuracy and not lose it to stringing shots. The caliber must be sufficiently powerful to hit a good blow at a distance. It should be capable of "bucking the wind," offer an excellent ballistic coefficient for long-range work, and ideally not have a report different from what is commonly encountered on the battlefield, lest the enemy immediately realize that a sniper is working the area.

TYPE OF ACTION

Action type is really irrelevant as long as accuracy levels can be achieved and maintained. For all practical purposes, this means a bolt-action or semiautomatic rifle. Before the Vietnam War, no one thought a semiautomatic rifle could be effectively used as a sniper rifle, but work in developing the National Match Conditioned M14 rifle ultimately led to the development of the M21 sniper rifle. Such rifles offered a number of benefits not found in conventional bolt-action rifles, and other military forces followed the lead of the United States in modifying standard military rifles. The design sought to obtain a higher degree of accuracy than in a standard weapon while still getting the high durability of modern military self-loading designs. Such durability due to well-designed and well-made parts is frequently missing from commercial rifles. Rifles such as the Swiss 550, H&K STG 1, Soviet Dragonov, and Israeli Galil all come to mind. Having tested them, however, I do not think that they are truly the equal of the M21 in top form.

DETERMINING RANGE

The biggest problem that snipers encounter is determining range. If it was not so difficult to determine the actual range of the target, much of the inaccuracy would disappear. Determining range actually encompasses two issues: how far away the target is, and how much the bullet will drop between the time it leaves the barrel and gets to the target. Fortunately, both of these points are resolvable with current technology, and in the future their resolution should be even easier.

During the Vietnam War, Leatherwood scopes included a ballistic cam to elevate the point of impact (POI) as the sniper adjusted the scope to determine distance. Merely putting the targets between the lines meant that at that distance 30 inches were covered, and by the time the scope had been adjusted to cover that space, the ballistic cam had adjusted for the drop. All was well then, assuming that an average-sized person was picked out. If the person was too small, the distance would be different than indicated, and, especially at longer ranges, the shooter would miss. Recently, this problem has been resolved with the advent of cheaper and smaller laser range finders. By using these, along with a range table broken down into units of 10 meters based on MOA, the sniper can spot his target, zap it with the laser range finder, check it against the table, click on the MOA adjustment needed, and be right on target.

During a range session in December 1994 when I was evaluating the Accuracy International AW rifle, I did precisely this and hit exactly on point at 505 meters with the first shot out of the barrel. I could have done as well with the M21 if I had had something I knew was exactly 30 inches in height, but because I did not, I can imagine that my on-target performance might have suffered. Instead of being able to hit the target in the eyeball, I would have had to satisfy myself with a chest shot.

As the ranges get longer, the problem gets worse. Learning to estimate range is more difficult for many people than learning to shoot properly. The laser range finder avoids this problem. If the range is known, the rate of drop becomes a known constant and is easily corrected for by the shooter.

BARREL

That then leaves us with the problem of the rifle itself. I believe that short-barreled rifles are just as accurate as long-barreled ones, because it is the bullet's spin that gives it the accuracy it needs. The impact of an additional 6 to 9 inches of barrel on that spin seems marginal to me. Similarly, a barrel does not need to be heavy to be accurate. True, heavy barrels tend not to flex like short barrels, and they do not heat up as fast; but for a sniper, the number of shots fired should be low, and the barrel that is straight to begin with and not artificially straightened later should not bend too much. My 18-inch, carefully trimmed, extra-lightweight .308 barrel shoots in 2 3/4 inches at 480 yards with 165-grain Federal Premium ammo, and it has had 15,000 rounds through it to date. Certainly, an MOA or less should not be beyond the reach of a properly designed rifle.

The top of the barrel should be covered with a forearm, but it must not be attached to the barrel, because that will alter the POI.

STOCK

In years past, stock warping was always the biggest problem in rifles, but today with fiberglass and Kevlar commonly available, this problem simply does not exist.

The sniper stock should be like that of a proper sporter—namely, nimble, round to fit the hand (not flat like a 2 x 4), and comfortable. A recoil pad is nice to minimize recoil effects for range work, but a solid metal pad is acceptable for true field use. Because a rest will frequently be lacking in the field, sling swivels and a sling should be fitted; a proper sling, intelligently used, becomes an 8-ounce bench rest.

TRIGGER PULL

The trigger pull on the rifle should be crisp but not excessively light: such pulls will sometimes jar off when the rifle action is slammed, plus, in cold weather when triggers are stiff, the pulls may result in inadvertent discharges. I rather fancy the two-stage military pull for just those reasons, and such a trigger can have a crisp pull as part of its second stage.

SAFETY

The safety should be capable of being either removed or applied without moving the shooting hand from the firing position. Many rifles are seriously deficient in this characteristic, but no sniper should be forced to decide between having to leave the weapon loaded, the action cocked, and the safety off, or having to move his hand when ready to shoot. Having to move his hand causes the sniper to lose his concentration at an especially critical time, and it slows response time when time is short. Any rifle built specifically for sniping should have an easy-to-operate safety system.

SCOPE AND MOUNT

The mount and scope that goes on the sniper rifle must be capable of taking a lot of abuse over a long period. One of the reasons for the long-term success of the British No. 4T and L42A1 sniper rifles was the use of the No. 32 telescopic sight. This scope was designed to be used on the Bren gun, and any scope designed to be used on a fully automatic LMG is likely to be much more rugged than one designed with only a single-shot rifle in mind. Similarly, the No. 32 scope was fitted into a mount suitable for the Bren LMG.

Many people take sniper scope and mounts on and off a rifle, but I believe this is a bad idea. It is far better to leave the scope and mount on the rifle all the time and take it off only if something is broken. By leaving them on the rifle, the problem of shifting zero should be eliminated. Many modern rifles built specifically for sniping do not have iron sights. However, because scopes can be destroyed by gunfire or other less spectacular means, I recommend adding a good set of iron sights to be used as a fallback. The sniper should zero the iron sights with sniper ammunition before fitting the scope. Because they are only intended for emergency use, the iron sights, once zeroed, should be ignored. Still, if the scope or mount gets damaged, the sniper will be glad that he has something to defend himself with against a hostile force.

MAGAZINE

Most sniper rifles have an integral magazine of the bolt-action design, whereas most semiautomatic rifles are magazine fed from typical detachable magazines. I believe a sniper rifle should likewise use detachable magazines because it allows the weapon to be used more easily and permits the sniper to change his loads at his leisure and still keep his rifle loaded when reloading or changing ammunition. An antipersonnel round is not suitable for hard military targets, and, similarly, hard-target ammo is not good for personnel targets.

SUMMARY

Overall, the sniper rifle must be easy to handle. The sniper wants to be able to move into areas with ease and without attracting too much attention. He must operate in close situations where it will be difficult to detect him and yet be able to flee rapidly if discovered. To accomplish all these goals, he needs a lightweight, handy rifle. This can be done if the sniper selects carefully and does not burden himself with stereotypes of past years.

The Squad Automatic Weapon

Once firearms came into existence and all members of the military unit were armed with them, the quest for weapon power began. The goal was to increase the speed of fire, hit ratio, and power of the soldier.

Over the years, weapons were developed that achieved this goal better than previously issued weapons had. Although these improved weapons performed better in certain areas, they tended to be heavier or more costly than the standard weapon. As a consequence, the weapon could not be generally issued; only a few men in each military unit could carry that weapon. From such developments have come what we today call the *squad automatic weapon*. (NOTE: For purposes of differentiation, from here on the term *squad automatic* will be used to refer to generic automatic weapons used by military squads. The acronym *SAW* will denote only the M249, which was not unveiled until 1974 by the Belgians and not adopted by the U.S. military until the early 1980s.) The squad is typically the smallest military unit.

Over the years, the squad automatic would shoot the same cartridges used in the weapons of the other squad members, but it would shoot them with greater long-range practical accuracy or shoot them faster. This led to such things as the Browning Automatic Rife (BAR) with U.S. troops and the Bren gun in the British and Imperial armies. The German army tended to use belt-fed machine guns (MGs) and figured that the riflemen were to protect the MG, not the MG the rifleman, as was the case in English-speaking armies.

With the advent of the MG34 and similar multipurpose MGs, many military people sought to get the firing capacity of a belt-fed weapon along with the ability to change barrels that a belt-fed capacity almost mandated. Unfortunately when this happened, the squad automatic suffered. Still the English-speaking military units did not adopt the German theory of maneuver units and, as a consequence, burdened their troops with even heavier weapons that could only be called squad automatic because they were used at that level of military organization. Things got especially confused in the 1960s when the 5.56x45mm rifle cartridge came into the rifle squad, yet the base-of-fire weapon stayed in 7.62x51mm NATO caliber. Throughout the Vietnam War campaigns, except for minor exceptions involving the Navy Seals, U.S. military units were burdened with trying to carry the M60 LMG as a squad automatic. As someone who has "humped" an M60 all day long over broken ground, I can assure you that this is not a good solution. The weapon is heavy and hard to shoot accurately like a rifle, and it is awkward to carry it and its ammunition in a ready position. As far as I am concerned, any weapon using a belt should not be carried by foot units in the field over broken terrain.

What are the elements of a proper squad automatic? Besides the normal dependability requirements that are obvious, it should be

light—and the lighter the better because the closer you can get it to the weight of a conventional rifle the greater the opportunity for the person carrying the squad automatic to be in the thick of things.

It should shoot the same ammunition used in the rest of the squad's rifles and, if possible, use the same style of detachable magazine to avoid confusion. A box magazine should be used on patrol, although a belt capacity, as exists on the M249 SAW, will be quite useful once the patrol is over and a dug-in position must be occupied. Concerning this last point, the new M249, with its detachable barrel and alternative box magazine/belt-fed magazine, is great. The weight at 15 pounds is slightly heavier than a standard M16A2 of 7 1/2 pounds, but not so great that it causes the shooter to stagger about the field. The rate of fire is too high at 900 RPM to permit easy single shots to be fired, but it could be lowered. The M249 can be used on both a bipod and tripod. When mounted on a tripod, it is not nearly up to general-purpose machine gun effectiveness at extended ranges, but it is at least 70 percent as good in my judgment. The problem is not with the weapon but the caliber. Had the M249 been chambered for a truly effective cartridge—along with reducing the rate of fire, lowering the weight a few more pounds, and balancing the weapon better—it would be close to an ideal squad automatic. As it is, the weapon is ill balanced and much harder to carry in the field than a similar-weight, properly balanced weapon.

Squad automatics can be either open or closed bolt. Although open-bolt guns usually have cook-off problems, the Soviet RPK seems to work fine and avoids the problem. I would think that any squad automatic would be better if it was a closed-bolt weapon. You could carry it on patrol loaded with a round in the chamber, ready to respond immediately by merely flipping off the safety. Most times you will want to shoot the squad automatic in a fast, semiautomatic mode, reserving burst-firing for either bunched-up targets or longer-range targets where a shotgun-like pattern of bullets is the best way to inflict maximum damage on the enemy. The way the U.S. Marines used the Johnson M1941 LMG or BAR (and the British the Bren gun) is an obvious example of this approach to a squad automatic.

With the proper squad automatic, the infantry squad's power on the battlefield will be considerably stiffened. Although the squad will lose one rifleman, it will retain the ability to shoot as accurately and powerfully as that rifleman would have, plus it will now be able to inflict damage at a greatere distance and over a longer period than the rifleman would ever have been able. With a proper gun, the squad should not lose speed or mobility, nor should it be required to use excessive energy that might reduce its effectiveness at another time or place. Unless all these things can be achieved by the inclusion of a squad automatic, there is no sense in going to the expense and trouble of procuring such a weapon for the unit; it would be better to stay with simple riflemen.

PART II

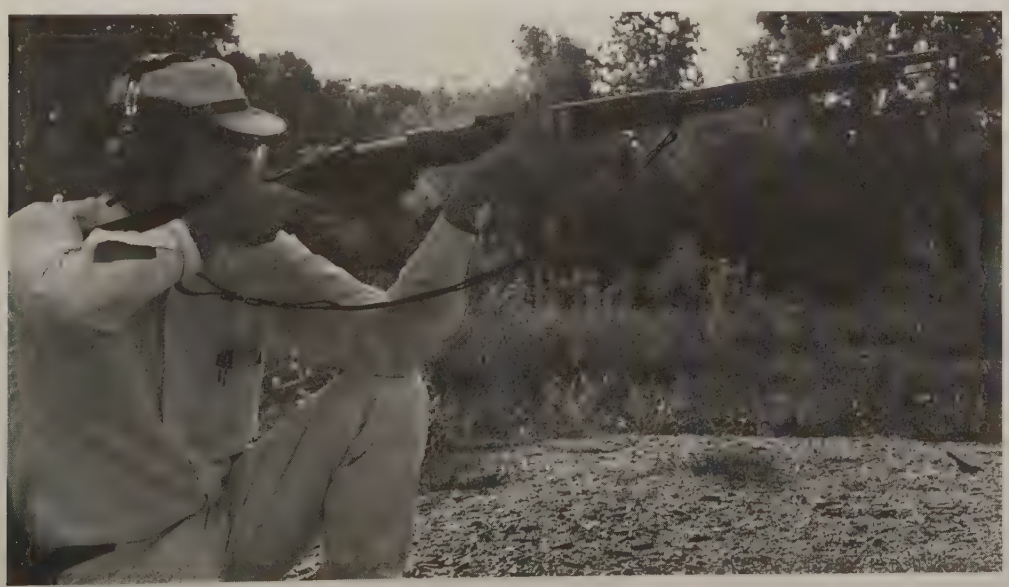
Argentina

M91 ARGENTINE MAUSER—7.65MM

Although one of the nations typically thought to be underdeveloped and poverty stricken, Argentina has often had very up-to-date military weapons. Well before the turn of the century, Argentina had become quite a wealthy, productive, and progressive country. And, although its military had no real wars to fight, the South American nation did have modern weapons. In fact, Argentina adopted the M91 Mauser in 1891, whereas the United States was still using the Trapdoor M1873 rifle, which was both single shot and black-powder charged; the French had the M1886 tubular-fed rifle; and most of the rest of Europe used single-shot rifles of varying patterns that had large bores and used black powder. The M91 was clearly an advancement over any of these weapons.

The M91 has a very long barrel, which makes it somewhat unwieldy, but the barrel is not heavy, so the weapon is not terribly muzzle heavy. The long barrel also limits the report of the weapon and minimizes the flash. The recoil is moderate because of the weapon's weight.

The sights consist of the typical pyramid front, which is not protected from jarring, and a rear sight with a V notch in it. This sight is graduated from 400 to 2,000 meters, and thus the rifle has a point of aim that is too high at typical engagement distances. The sights are very hard to see and use even on a bright sunny day and would be worse on moving targets or in darker conditions.



The author firing the Argentine M91 Mauser 7.65mm.

The bolt handle sticks straight out and is smooth, the way it should be for quick operation when using the palm of the

hand rather than grabbing it with the fingers. The magazine is a single-column-type rather than the double-feed variety of later Mausers; as a result the M91 is much less well-designed and (even worse) awkward to handle when carrying the weapon at that point. Why Mauser did not make it detachable at that time, when people were already used to the idea of a protruding magazine, is a mystery to me. It certainly would have been better for the M91 and might well have changed the development of combat rifles. Interestingly, the rifle lacked a bolt-hold-open device, as did many early Mausers until it became apparent that this was a good feature.

The M91's bolt handle knob is well designed for rapid use, but the polished bolt handle is evidence of a lack of sound tactical judgment on the part of the designer.

The trigger is a typical two-stage affair, but once pulled to the second stage, it is fairly crisp. As mentioned earlier, the rifle's length makes it somewhat unhandy, but the M91 is not unbalanced in either kneeling or off-hand work.

Accuracy is only fair with the M91; the limitations are caused primarily by the difficulty in seeing and using the sights.

The first centerfire rifle I ever shot was an M91 Mauser, which I fired when I was 9 years old, so I always have had a soft spot for these weapons. They used to be widely available for $19.95, but over the years the customizers and corrosive ammunition used by people who did not know better have taken their toll. When found in good condition, like the test example, Argentine M91 Mausers are beautiful examples of pre-1900 German engineering, and the Argentine private who held one in his hands before 1900 had a weapon equal to that of any army in the world.

M91 ARGENTINE CARBINE—7.65MM

This carbine reminds me a lot of my favorite M95 Spanish carbine, except, of course, it has a single-column external box magazine. Like my favorite, however, it is a full-stocked weapon that is simply "cute." It is light and handy yet shoots a serious rifle cartridge.

The rear sight is sighted for 400 meters when down and graduated for 600 to 1,400 meters when flipped up. As a consequence, at typical combat ranges of 200 to 300 meters, it shoots high, and you must aim for the knees to hit your target in the chest. This is a very bad feature and one that is difficult to remedy because you need a higher front sight. Adding metal to it seems the most logical way, but this gets to be a big project. I know—I have done it. Fitting a peep rear gets a much better sight picture over all. The front sight is the typical European pyramid and is well protected by sturdy ears. The rear sight is a narrow V-shaped notch. It is too shallow and narrow for quick work or use in dim-light situations. The rifle has the standard Mauser

The author with the M91 Argentine carbine. Note the case being ejected and the proper use of the bolt action: using the palm of the hand to move the bolt to the rear and keeping the rifle butt pressed against the shoulder.

The rear sight on the M91 carbine as seen by the shooter. The sight is graduated to ranges that do not reflect practical use. The notch is also too narrow and shallow for quick work.

safety, which, of course, is reliable but terribly slow.

The Argentine carbine has its sling swivel at the pistol grip on the left side, and the swivel will hit your fingers when you grab the pistol grip if you are not careful. This can hurt as your fingers are pushed back by the recoil—the 7.65 Argentine cartridge is a real rifle cartridge, and in a light M91 carbine, it will kick. The power of the cartridge, coupled with the short barrel and light weight, results in quite a bit of blast and recoil, and, although it is not terrible, I noted with some interest that it was greater than what I encountered with my similarly stocked 7x57mm carbine.

On most military rifles from this period, I find that I must lift my cheek to get my head high enough to see the sights. For reasons that are unclear to me with this rifle, I had to really push my cheek down on the comb to get my head low enough to see the sights. This was a very odd feeling for me, although I like the feature because it gives you a constant sight picture that you are missing when you have to raise your head off the comb. With the sights in the low 400-meter position, I had to push my face on the comb so hard that it was almost painful, whereas with the rear lifted, the comb merely got full contact. Unfortunately, even with a good sight picture, the narrow, shallow V notch, coupled with the pyramid front, made keeping a proper sight picture difficult. It was neither fast nor precise enough to satisfy me.

The trigger pull, interestingly enough, is quite light and crisp. I thought at one time that perhaps the Mauser M95 carbines I had encountered in the past had been "played with" to get light pulls, but since they were identical to the one on this M91 carbine, I have decided that this is the way they were

made at the factory. They certainly are nice triggers—no product liability concerns in those days!

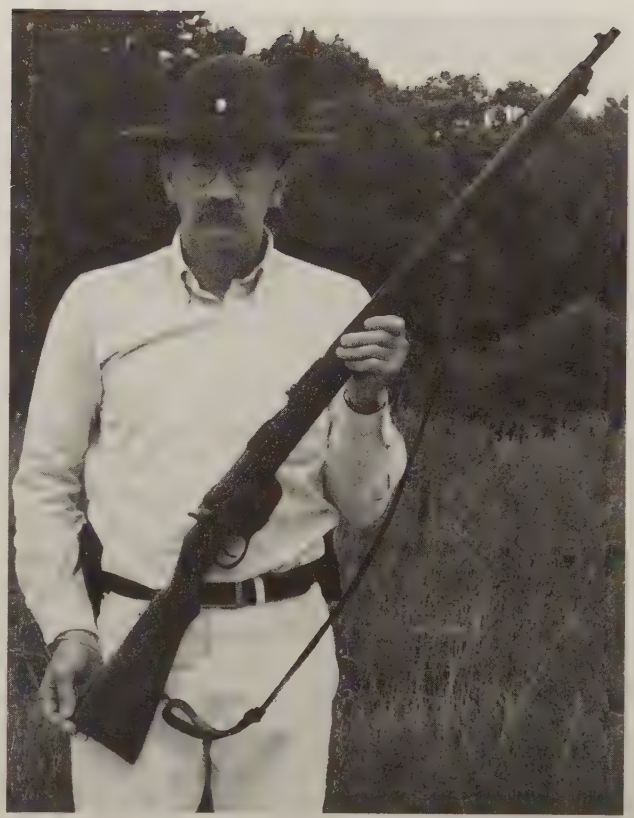
The Argentine cavalryman who was issued this little carbine was hampered by poor sights and improper sight graduations, but at least he had a well-balanced, handy piece to carry on patrol.

Austria

M95 STEYR AUSTRIAN—8X50R

The M95 is a straight-pull rifle not commonly shot much in the United States. This is a shame, because it is a very fine rifle from the standpoint of speed of fire. The M95 was the standard service rifle of Austria in World War I, and, because of the nature of Austro-Hungarian holdings, it was used extensively in the Balkans and Italy. During World War II, the German ordnance technicians modified it to fire rimless 7.92x57mm ammunition, which I believe should overcome anyone's doubts about the strength of the weapon. German 7.92x57mm military ammunition has always been loaded up to ensure the full measure of performance.

Sights are calibrated from 600 to 2,600 meters on the slide with two battle sights. The one the shooter sees when the sight is down is set for 500 meters. By raising the slide up, the shooter exposes the 300-meter V notch. What this means is that you must put the slide up to use the 300-meter setting. Because these slides tend to catch on things, this seems to be a bad idea to me. You also have to raise the slide up high enough so that the 300-meter notch can be seen, otherwise you will l shoot over every target. Before I discovered this feature, with the slide down and using what appeared to me to be the battle sight, I was shooting over my



The Austrian M95 Steyr rifle.

target at 100 yards by 5 or 6 feet. I am certain this design flaw allowed many men who were shot at to survive the war.

The rear sight has a small V notch on it,

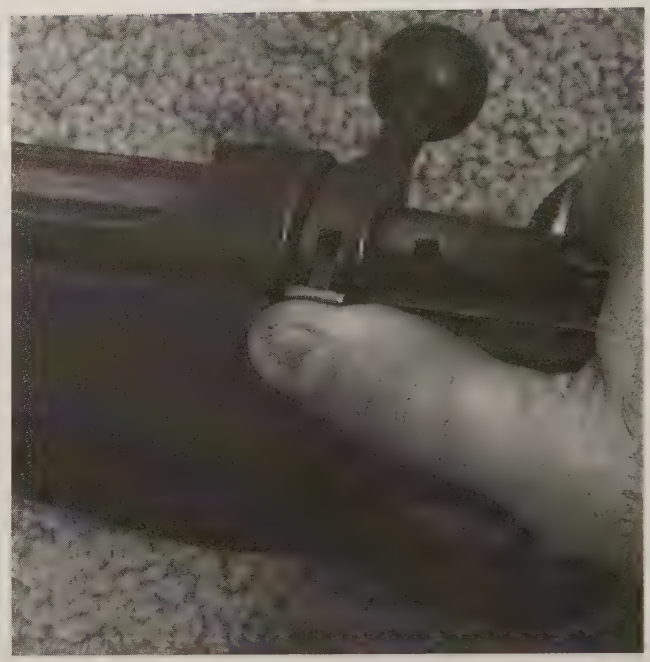
which is difficult to use. The front sight is pyramid-shaped and is not protected by hood or wings. The sights are difficult to use well and are slow. This weapon uses a stripper clip, which is inserted into the action and drops out when the last round is chambered. Without the clips, however, it can be used as a manual single shot. It naturally has no cutoff. The bolt action is very smooth and fast, although it does not seem as fast as the M11 or K31 Swiss rifles. The trigger pull on the example tested was very hard, and that, coupled with the poor sights, made accurate shooting very difficult.

The rifle does not contain a butt trap or a cleaning rod, which is a serious error. The rifle got very hot after firing only a few shots rapidly, but that did not seem to affect functioning in any manner. Although the barrel is long, it obviously does not have a very big diameter, and this, no doubt, is the cause of the heat transference. Despite the apparent light weight of the barrel, its length makes the rifle muzzle heavy, making off-hand shooting tiring.

The rifle has a safety, which, on first glance, looks as if it would be slow to operate. The rifle uses a straight pull on the action, so the standard trick for dealing with slow safeties—leaving the bolt handle up—will not work because the action can be closed too easily. However, a little experimentation on my part showed that if I wrapped my hand around the action, I could push the safety off quickly with my thumb. Using this method, it would be possible to flip the safety off easily even when wearing mittens. Once the safety has been released, the hand would then take up the firing position.

The trigger guard is a standard size that would be awkward in winter, I believe, and I find it surprising that the Austrians, who must have known they would use this rifle on the high snowy mountains, did not see fit to equip the rifle with a large trigger guard so the weapon could be more readily fired by mitten-wearing soldiers.

The M95 is a very fast rifle to shoot but is limited by its poor balance and sights. The recoil is light, as is the blast, but both of these are gained in part by making the weapon too long. It must have been real trouble to carry this weapon in the mountains.



The author found that by wrapping his hand around the action, he could push the safety on or off quickly with his thumb, even if he was wearing mittens. The safety is shown in the off (or down) position.

Equipping the rifle with a good trigger, shortening it a bit, and adding a set of sights that could be quickly picked up and used would make the Austrian M95 a much better battle rifle.

M95 STEYR CARBINE—8X50R

A lot of people who have never used them tend to ignore straight-pull rifles, but they are actually quite nice and very effective. The M95 Steyr carbine is just as fast as the M95 Steyr rifle just discussed. The carbine is also lighter and shorter, which makes it even handier, and I prefer it to the longer version for that reason.

The M95 carbine is not merely a "short rifle," however; it does have a few features

An Austrian cavalryman carries the M95 Steyr carbine.

that distinguish it from the rifle model. First, it has sling swivels in both the bottom of the stock and the side: a clear indication that this carbine was destined for horse troops as well as nonline infantry formations. Of course, if we think about it, we remember that the prewar Austro-Hungarian army had large cavalry units that were very effective during World War I when the terrain permitted it.

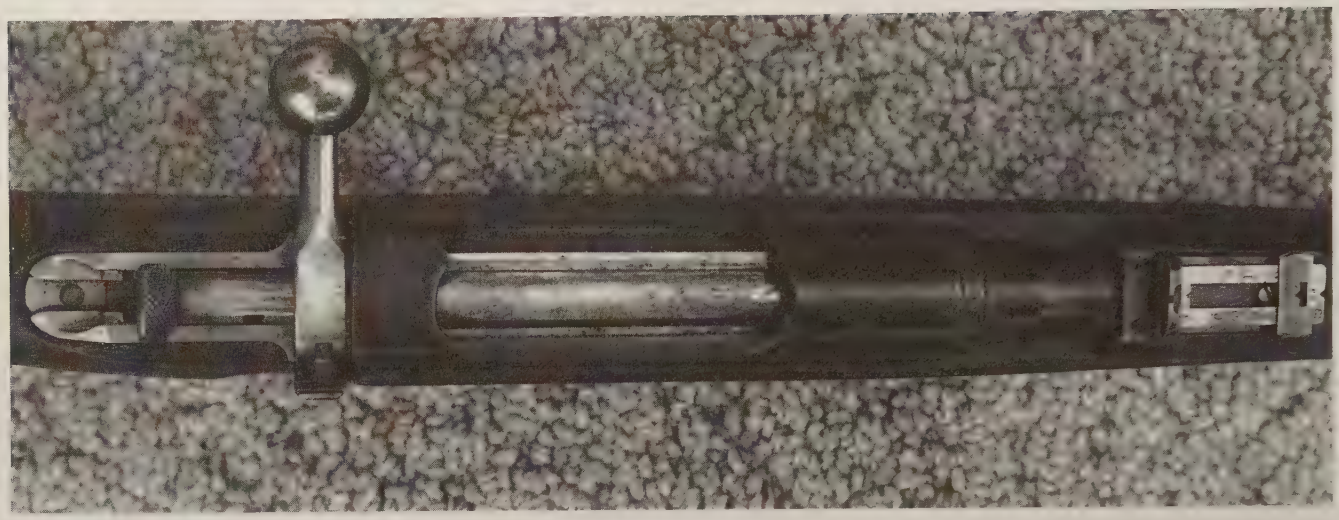
The front sight is the typical pyramid front unit, but unlike the rifle, the carbine sight is well protected by sturdy wings. One reason for that design feature is no doubt due to the fact that it was typically carried in saddle scabbards, which would have pressed against the front sight. The sight is difficult to see and use, as is the V-shaped rear notch in the ramp back sight. The rifle is sighted from 300 to 2,400 meters, which seems especially excessive for a carbine. Oddly enough, with the sight folded down, it is set for 500 meters. Only by raising the rear sight could you raise the leaf, thus exposing the 300-meter setting. This means that if you did not raise the sight blade—which, of course, would tend to snag on objects and tear up your hand when running with the rifle—you are forced to use a rifle sighted for 500 meters. In actual tests, I found doing that caused me to hit about 7 feet high. My rounds went over a man-target even when aiming at the knees. In fact, the only way you could hit a soldier in the chest at 100 yards would be to aim at the ground about two feet to his front—a very unsatisfactory state of affairs. Even with the sights raised, exposing the 300-meter leaf, I fired very high at 100 yards because of the trajectory of the 8x50R cartridge. Finally, the sights were difficult to use no matter where they were adjusted for because they were narrow and dark. It made adjusting for both windage and elevation very difficult.

The butt trap contains no cleaning gear, nor does the carbine have a cleaning rod. Both of these omissions are serious on a battle rifle that is designed to be used hard.

The carbine has the standard straight-pull action coupled with a Mannlicher-style magazine feed system. The action is well fitted and works smoothly, permitting very fast shooting.

The trigger is relatively smooth, although it did have a lot of overtravel. Such triggers can be mastered with practice, however, and are certainly better than those found on many modern selective-fire battle rifles such as the H&K G3.

The safety can be used effectively once you determine how to flip it off promptly. This takes some experimentation, but if the shooter practices and has at least some mechanical skill, the carbine's safety is



This top view shows the carbine in a locked position. You can also see the rear sight, which is graduated from 300 to 2,400 meters—a bit excessive for a carbine. When the sight is flat, as shown, it is set for 500 meters. Only by raising the sight can the shooter expose the 300-meter setting. The bolt handle is large and designed to be thrust forward with palm pressure, not holding the bolt with the fingertips. This is an excellent, fast action.

quicker than the one on an M98 Mauser.

The carbine has side-mounted sling swivels to permit the rifle to be slung across the back. Unfortunately, the swivel installed on the pistol grip interferes with the shooter's grip: his fingers will hit the swivel when taking up a firing position. I would remove this swivel if I were issued this type of carbine.

I like the M95 carbine because it is quite handy and yet weighs enough to keep the recoil from being too great. The blast is greater than that of the rifle version, but it is not oppressive by any means. A good set of proper sights would go a long way toward making this otherwise basically unusable carbine into an effective battle rifle. An error in tactical thinking prevented the Austrians from adopting such sights, and as a consequence, its soldiers suffered while its enemies benefited.

STEYR SSG

The Steyr factory is well known for its weapons, so when it announced its SSG 7.62x51mm sniper rifle, I was very interested. When I later read reports of its adoption by a number of European countries' military and police forces, I got even more interested. Then, when I read Jeff Cooper's glowing report in *Soldier of Fortune* magazine, in which he reported great accuracy at almost 1,000 yards, I had to have one. After some delay, I got one, as well as a few of the hard-to-obtain 10-shot "military only" magazines.

The trigger was a double-set type and broke crisply. The weapon seemed somewhat heavy, and it felt "dead" in my hands. I found it did not seem to jump up in a lively fashion when used in the off-hand or kneeling position, but I thought all would be forgiven when I saw the great long-range groups this "precision shooting machine" would afford me. I purchased a case of Federal Match ammunition so there could be no doubt about the accuracy of the weapon and went to the range after mounting a fine Leupold scope on the weapon.

Examining the rifle, I was excited to get it on the range. I noted that the rifle had movable spacers on the butt, so it could be adjusted for the individual shooter and time of year; obviously, shorter stocks are

The Mannlicher SSG sniper rifle is heavy, shoots only the weak .308 Winchester round, and is not especially accurate.

necessary when the shooter is bundled up for the winter—a nice feature. The stock was made of a plastic material and had checkering pressed into the wood. Unfortunately, it was not sufficiently coarse to be useful and was merely decorative. The barrel was free floating, so I decided that it would be a very good sniper rifle even if it was heavy and long and felt dead in my hands.

Putting up a target at 100 yards, I started to work on my group. The first thing I noticed was how much the rifle kicked. Because the stock was very light and the barrel long and heavy, the weight was all toward the front. Recoil seemed very high. Unlike with fiberglass stocks, which seem to give and absorb the recoil, the plastic Steyr stock merely transmitted it completely to my shoulder and face. Five rounds of .308 Match ammunition in the Steyr SSG felt like I had a guy pounding me in the face and shoulder each time.

High-recoil rifles can be acceptable if they are also light, powerful, and accurate. Unfortunately, the Steyr SSG failed on all three counts: it is heavy; shoots only the common .308 Winchester round, which is certainly not powerful; and, worse for a sniper rifle, it is not especially accurate. The best groups I could get out of five-shot groups was a little over an inch. Now, I do not believe an inch group is bad by any means for a lightweight sporter designed to be used on game the size of deer at 300 yards or less, but it simply will not do for a rifle that should be coming into its own at 500 yards and should be capable of dealing a blow at 1,000 yards on a man-target.

I thought that perhaps the poor groups were the result of my shooting ability and that I simply was not good enough to "milk" all the potential out of the weapon, so I let others who were present, including Ed Seyffert, a noted local law enforcement officer, try it. All had the same results.

I thought that the SSG might do better at longer ranges and tried it at 450 yards. Naturally, it was not any better, resulting in a 6-inch group at that distance. This kind of

group simply will not do—that means you will not be able to keep your shots on a man at 1,000 yards. A rifle such as the SSG should be capable of no more than 3/4 MOA performance out to 1,000 yards, perhaps even 1/2 MOA.

Changing ammunition did not improve anything, nor did changing scopes. Did I get a bad example? Perhaps, but I do not know anyone who has another one to test. Perhaps Cooper had the fluke. Even had I achieved great accuracy, the weapon's length, weight, excessive recoil, and stiff and slow bolt action would cause me to pass over the Steyr SSG for my Remington M700 bolt gun. It is easier to shoot, lighter, and shorter; recoils less; operates more quickly and accurately; and, perhaps most critical for me, feels "alive" in my hands.

AUG

The Austrian Steyr AUG (Army Universal Gun) is a modern bullpup 5.56x45mm "rifle system." The weapon has interchangeable barrels: the standard rifle has a 20-inch barrel, but it can also take a 14-inch "SMG" barrel, a 16-inch "carbine" barrel, and a 24-inch "sniper rifle" or "LMG" barrel. The AUG has proven successful since it first came on line in 1977 and has been adopted by Oman, Saudi Arabia, New Zealand, and Australia, among others. It is also a favorite of the British SAS, which apparently prefers it to the SA80.

The typical top half of the receiver includes an integral 1.3X scope with a circle reticle, but a different top half that allows the use of various telescopic or night sights can be fitted. The standard stocks are green plastic, but tan, white, and black are also seen.

Possibly, the most important element of the AUG is its sighting system. It is the first widely issued battle rifle that uses a telescopic sight exclusively. There is a small notch on the scope body and a small projecting stub on the front of the scope body. Together, they are supposed to be emergency fixed sights. The manufacturer must be kidding: at 50 yards my AUG shot well off, yards off actually, when compared to the POI when using this scope. I think a person would do better shooting instinctively than using those sights.

The scope is 1.3X, and in actual use it does not seem to magnify the targets. I found that I could use my AUG on aerial clay targets without problems and broke quite a few of them as they were thrown by the clay-bird thrower. Any time you can hit thrown clay pigeons with a rifle, you know your rifle is handy. The AUG was not as handy as my M700 Remington (I went 7 for 7 one time), but it was a lot better than a G3, FAL, or BAR

The author firing a 20-inch-barrel AUG. The photo was taken just as the bullet leaves the barrel. Note the smoke from the muzzle (which is still level) and the case (blurred) exiting the ejection port.

when I tried the same trick. The reticle is a circle. Supposedly if you can put a man in it, the round will hit the target because of the low trajectory of the 5.56x45mm SS109-type ammo. Shooting as I do at metal plates, mainly 10 x 14 inches, I found that I could center them at 200 yards, but at 300 yards, I have to raise the impact point—merely centering at that distance results in misses. A traditional cross-hair scope is also available. I think I would prefer that but have never had an opportunity to try it.

Steyr claims that the scope and its mount are nearly indestructible. When it first came out, I doubted it, but since the weapon has now been used by troops other than well-trained, polite, and peaceful Austrian boys, I am more inclined to be a believer. I still could not bring myself to drive over my personal AUG in a truck or drop it from a great height, but I would be happy to try it if someone else would offer me a weapon to test and destroy.

The AUG is a bullpup design, bringing with it all that design means. Basically, the term bullpup means that the weapon is short in comparison to its barrel length. An AUG with a 16-inch barrel is the same size as a stocked MP5 9x19mm SMG. Obviously, the AUG is a much more serious weapon, but in exchange the AUG suffers some real drawbacks. First and most important, you cannot shoot off the left shoulder (assuming you are right-handed). In urban areas, especially, this can be a real problem, as you are forced to expose more of your body than would otherwise be the case. I realize you can cant the weapon on its side or back away from the corner to minimize this exposure, but neither is a great solution—and the latter is impossible when you are in a doorway. The AUG is also somewhat louder than a similarly barreled weapon because the end of the muzzle is closer to your face and the chamber is directly under your ear. I always notice the difference in firing my AUG versus my M16. The AUG can be changed over for a left-handed shooter, but it requires extra parts and is not something to be done in the midst of battle.

The AUG uses a variety of plastic parts

The generous and well-designed trigger guard on the AUG allows the shooter to wear mittens in cold weather. The photo also depicts the easy-to-use safety button.

that are easily accessible by removing the buttplate. Similarly, the barrel can be removed rapidly, and this aids in maintenance. Certainly, the soldier in the desert must appreciate this fact.

The AUG's trigger guard is substantial enough that a winter trigger guard is not necessary. The safety is easy to locate, engage, and disengage.

The AUG uses no separate selector. Merely pulling the trigger partway back will fire the weapon in semiautomatic mode; pulling it all the way back gets full auto. I would like to know how this arrangement works in a military environment. In a noncritical situation, I found the system to be quite workable. To its credit, you had to think to get it to fire full auto. I had feared that you would inadvertently pull it to full auto all the time, wasting ammunition. It appears not to be a real problem.

The AUG I tested fired at more 900 RPM. Because of the recoil of the ammunition, light weight of the rifle, and scope sight that tended

to jump around when a burst was fired, I recommend that full-auto fire be restricted in the AUG, just as it is in every other similar rifle that takes 5.56x45mm rounds. It should be used only at very close range in an emergency.

You can see through the smoky-colored plastic magazines in order to check ammo supply. The magazines are also slick, having some type of self-lubricating ability, as well as being sturdy, light, and reliable.

The AUG does not have a traditional forearm, but rather a handle that folds up when not in use. I have seen people try to use the handle like a normal forearm, but it moves easily and the barrel is hot, so use it as it is meant to be used and avoid the problem.

The AUG has a flash hider that reminds me somewhat of the old birdcage unit installed on early M16 rifles. I would imagine that it catches vines the same way the M16 did, and I would not be surprised to discover that the New Zealand and Australian armies modify that part because they tend to operate in such environments. On the other hand, the Omani army is likely never to have a problem with the flash hider.

The AUG is not lightweight, but it is lighter than the British SA80 and it does work—something the Enfield product cannot claim (although I found my test L85A1 quite reliable).

The gas system has a small degree of adjustment to it, which I found useful when I shot Portuguese M193, Canadian SS-109, and Norinco M193 ammo all on the same day. I rather like gas adjustment systems that offer a little adjustment. The trigger pull is never going to be confused with a bolt-action rifle, but for fast work, it is not bad.

Another desirable design element of the AUG is the buttstock that opens up to reveal cleaning equipment: oil, patches, and pull-through brush.

By definition, the AUG is really a 300-yard gun. Whenever I shoot mine at longer ranges, the results are disappointing. However, since 90 percent or more of infantry encounters are within 300 meters, it does not mean much, I suppose.

I am rather taken with the AUG (although I would prefer a cross-hair scope), but it is not nearly the rifle a SIG STG-90 is. Given a choice between the two, I would always opt for the SIG STG-90 despite what seem to be the many modern innovations represented in the AUG.

Belgium

M89 BELGIAN CARBINE—7.65MM

This is the carbine version of the standard M89 rifle. As such, it is lighter, shorter, and much handier to use than the rifle version. Like its longer brother, it has a barrel jacket fitted over the barrel rather than an upper forearm. I would imagine that creates severe rust problems and causes it not to work well in very warm weather. For use in Belgium, it may have been acceptable, but once the rifles went to the Congo, I imagine this became a severe problem.

The weapon is fitted with the typical Mauser two-stage trigger and slow, winged safety unit. Sights consist of the V-notch rear, but at least on the example tested, it was bigger than what I have come to expect on European rifles. Therefore, it was a lot easier to see and use the rifle, although none of these pyramid fronts and shallow V-notch rear sights are easy to use and to get quick hits in wartime situations.

The carbine has a pyramid front sight not protected by any wings. The rear sight is graduated from 100 to 500 meters when in the down position and 600 to 1,800 meters when raised. Although the longer settings are not really useful, at least the carbine could be used effectively at standard combat distances. This must have been very helpful in World War I trenches when shooting at German heads 80 yards away.

This Mauser has a single-column magazine

The M89 represented the first in an illustrious line of combat rifles and was a major improvement over what was available elsewhere. A clip-loading rifle firing smokeless cartridges with pointed bullets that were fed into the magazine with one single push represented a major advancement in firearms design.

that projects below the body of the rifle and, unfortunately, is exactly at the point where a person holds the rifle to carry it when walking. No doubt this feature caused many magazines to get rusty from sweaty hands. Additionally, because the magazine did project below and was made of thin sheet metal, it was easily dented—much as the barrel jackets get dented easily. On the barrel jackets it looks unsightly, but on the magazine it will interfere with the weapon's functioning. If the magazine was going to extend below the weapon body anyway, a detachable magazine rather than fixed one would have been better.

The rifle, like many pre-1918 Mauser rifles, does not have a hold-open device. I am certain that this design failure was acutely felt in the early days of World War I when Germans swarmed over Belgium and many an M89 was shot dry at the horde of advancing Germans.

The short barrel produces heavy muzzle blast, but the recoil is not nearly as oppressive because the weapon is only marginally lighter than a rifle. Shortening a small-diameter barrel and thin sheet-metal barrel jacket a bit does not lighten a carbine very much. The M89 carbine was designed to be used by horse soldiers and slung across the back. Accordingly, it was equipped with side-mounted swivels that allow it to be placed flat across the back. The rearward swivel is placed at the pistol grip area. This would strike my strong hand when shooting the weapon, stinging it slightly. Naturally, it would be impossible for a left-handed shooter to use it.

Although not as good as the one on the M60 Finnish, the SIG STG 550, the M16, or even the M98 rifle made with large trigger guards for the Russian front, the trigger guard is fair-sized and at least gloved fingers could fit into it and not jam against the trigger.

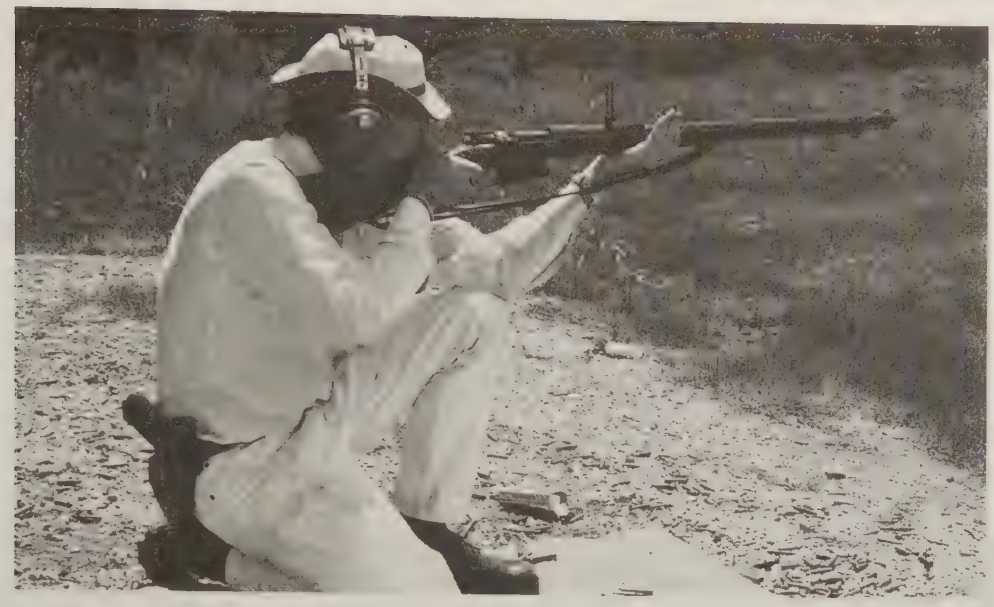
The M89 is interesting mainly because it represents the first in a very illustrious line of combat rifles. The rifle may have had a number of features that were later determined to be worthless or even drawbacks, but it was a major improvement over what was available elsewhere. When we look at the M89, we must realize that when it came out, the world's armies used the M1873 Trapdoor Springfield, Martini Henry 577/450, M1886 Lebel, or other similar rifles. As such, a clip-loading rifle firing smokeless cartridges with pointed bullets that were fed into the magazine with one single push represented a major advancement.

BEL M91—7.65MM

This is the rifle that actually got the Fabrique Nationale (FN) in Liège, Belgium, started in the arms business. In the Belgian format tested, it is rare in the United States as a result of the heavy losses sustained during World War I. However, in its Argentine format, which is basically the same except it has no barrel jacket, it is common and likely to be encountered almost anywhere in this country.

The Belgian service model has a very interesting feature: a metal tube covering the barrel. This was designed to keep the hot barrel off the hand of the soldier and was lined with felt for added insulation. I would imagine most of the felt got very damp, rusting the barrels frequently, but perhaps the tight fit prevented water and air from getting in, hence retarding rust. Many people mistake the barrel jacket for an actual barrel, but the jacket will become dented if struck hard enough. Besides, a little thought would also show that a barrel that thick would be much heavier than the barrel on the M91.

This Bel M91 is based on an early Mauser design, before the double-column magazine was introduced. Although the action is smooth, it lacks a bolt guide, and there is no hold-open when the last round is fired. This no doubt caused problems when the weapon was in active use. The magazine holds only a single column of ammunition and extends beyond the stock much more like a Mannlicher than the later, more familiar Mauser actions.



The author testing the Belgian Mauser 7.65mm.

The Belgian Mauser rifle is distinguished from its Argentine counterpart by the barrel jacket. Although many people mistake the jacket for the barrel itself, the jacket can be dented if struck hard enough.

The recoil on this rifle is surprisingly heavy given the weight of the rifle, but muzzle blast is low, as might be expected given the length of the barrel. Of course, the 7.65 cartridge is every bit as powerful as the .30-06 cartridge, and the M91 is not stocked to minimize felt recoil.

The sights are the typical European pyramid front coupled with a shallow V rear ramp. They are adjusted to hit, at the lowest setting, at 400 meters. This naturally makes close work very difficult. In fact, when I tested the rifle at 100 yards, I was shooting over the impact mound, which was at least 4 feet higher than my POI. I recently read that German troops in the trenches of World War I found these 400-meter minimum-zero ranges as irritating as I have when they realized most of their targets were closer than 200 meters and were small, and that it was not feasible to aim at unseen knees. A scramble was on to fit higher sights to the rifles without, I imagine, much success. Filing down works OK, but raising sights takes added material, and it is never easy to get the material to stay on because of heavy recoil. I am certain the Belgium soldier armed with the M91 felt the same way. No doubt hundreds of soldiers on both sides owe their lives to the faulty design concepts reflected by such sights.

Looking at this rifle and then reviewing the M93 Mauser, it is instantly apparent why

Belgian troops armed with the Bel M91 rifle early during World War I.

the latter was so well received. In comparison with the M91, the M93 is a much better and more refined design. Not only is the action stronger, but the protruding magazine is missing. The expensive-to-install and difficult-to-maintain barrel jacket is gone. A bolt guide helps minimize binding. Altogether, the M93 is a definite improvement over the M91. Of course, if compared with the French M1886 tube-fed repeater or the M91 Mosin-Nagant, even more so the M1886 Springfield Trapdoor or Remington Rolling Block, the M91 Mauser looks like a definite improvement.

But when they adopted the M91, little did the Belgians realize that a substantially improved rifle was only months away.

M1924 MEXICAN—7X57MM CARBINE

The first thing you will note when picking up this rifle is how light and handy it is, in contrast to its big brother, the M1924 rifle. This carbine has a 16-inch barrel and a sight radius of only 12 1/2 inches. As a consequence of the short barrel, the blast is substantially higher than it is with a rifle-length barrel. Fortunately, the 7x57mm cartridge is fairly moderate to begin with, and, by shortening the barrel, the effect is about like shooting a .30-06 cartridge in a 24-inch barrel. Not unmanageable by any means, but clearly the typically mild-mannered 7x57mm cartridge takes on a slightly different character when shot in such short-barreled carbines.

The author found the Mexican 7x57mm Mauser carbine with a 16-inch barrel quite handy. Its major shortcoming is its sights, which greatly limit its usefulness.

Although blast was not great with the military ammunition I was shooting, I did not notice any substantial muzzle flash, so obviously my FN ammunition was burning completely evenly in the shortened barrel.

This carbine was produced by FN in the 1920s when Latin American countries were cut off from their traditional source of Mauser rifles in Germany, and it reflects many design features common to Mauser rifles introduced thereafter. The front sight remains a pyramid style, and, oddly enough, given the use of this carbine by cavalry troops, the sight is not protected by wings or a hood. The rear sight is a V notch graduated for 200 to 1,400 meters. Apparently the lessons of the trenches—when it was discovered that sighting battle rifles in for 400 meters and aiming low at closer ranges—were not retained. The sights are still difficult to use because of the difficulties of maintaining elevation and windage with the very narrow and shallow V notch.

The safety and trigger system remain typical prewar Mauser and, interestingly enough, the rifle lacks a bolt hold-open device, something that was similarly missing from German rifles issued during World War I, but which they discovered was a tactical error. The new K98 would have this bolt hold-open feature, but FN apparently had not determined that it was needed when this Mexican contract was filled.

Although many people find these short little carbines ill balanced, I must say that I find them very handy: I could do good work in either the off-hand or kneeling position with it because of its balance. Certainly, the short sight radius interfered somewhat with my ability to maintain proper sighting patterns, but it was not the balance that restricted me. The 7x57mm cartridge is a serious rifle cartridge, and with proper bullets it has been used to kill everything that walks on this planet. Given a choice between this carbine and a longer-barreled rifle, I would always prefer this carbine. Typically, when I have short rifles made, I use a 20- or perhaps 18-inch barrel, but this carbine showed me that a person could go down to 16 inches with no reduction in efficiency and still retain a handy, well-balanced piece that could be used quickly in practical shooting positions. Had this carbine been fitted with sights that could be easily seen and used, it would have been nearly an ideal bolt-action battle rifle. As it is, the lack of truly effective sights reduces its effectiveness considerably.

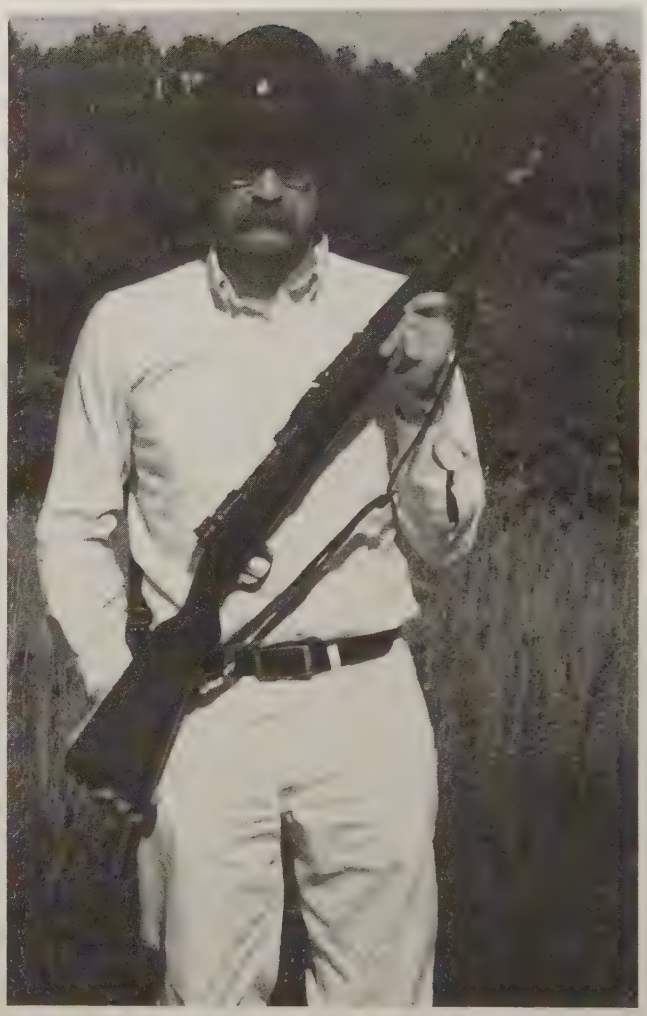
M1924/30—7X57MM

When the first war ended in 1918, the Mauser factory was basically out of business. Of course, this did not mean that the demand

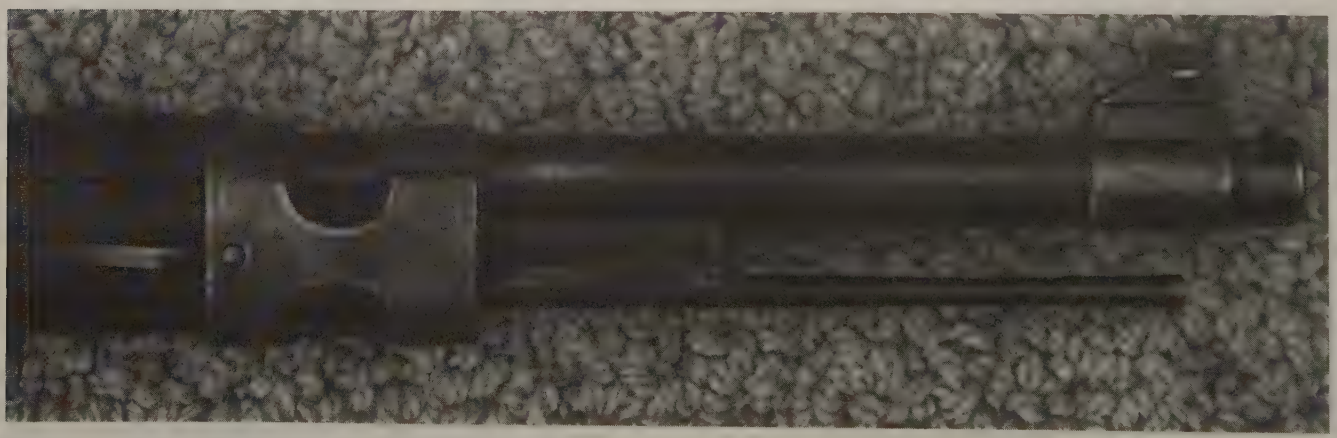
for Mauser-actioned rifles had ended. Cut off from their traditional source of Mauser rifles, many Latin American nations turned to FN for rifles. The Belgian arms manufacturer was able to supply fine rifles built to the specifications of the countries that wanted new rifles. Although each country had different things it wanted, they all were based on a basic action type. The FN M1924 was a development of the wartime German M98-action-type rifle. In fact, the German-built K98 of World War II fame was very similar to the FN M1924 rifle.

The test example was built for the Mexican government and was chambered for 7x57mm. This pattern was made in a variety of calibers for other countries, differing only as minor fittings. The front sight is a pyramid type with no protection from either damage or sun. As such, it is easily damaged, and the sun will reflect off it differently at varying times, altering the POI because of the visual appearances to the shooter. The rear sight is a V-notch rear, graduated from 200 to 2,000 meters. Although still an unrealistic range at the high end, at least the rifle was capable of being used at realistic combat ranges, so apparently someone had listened to the complaints of the German infantrymen who had to either aim low or somehow alter their sights on the GEWR 98 during World War I.

A typical Mauser safety is fitted, as is the two-stage military trigger. The trigger guard is



The M1924 represents an improvement over the pre-1914 designs using the same action, but it suffers from a couple of design errors: poor front and rear sights and the lack of an integral cleaning supply.

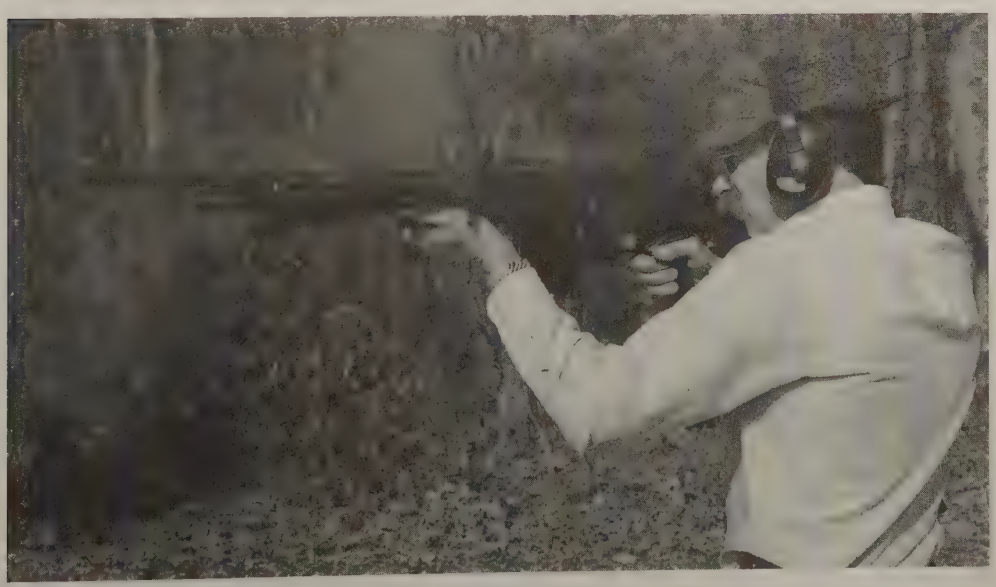


The front sight of the M1924 is unprotected, and the sight on the test example was in poor shape.

too small for gloved or mittened hands. Even in Mexico, it gets cold in the mountains, and even though a large trigger guard is no liability, one that is too small is. No butt trap is supplied for cleaning equipment, which is a shortcoming, but a cleaning rod is slung under the barrel.

According to the date on the test example, it was made in 1924 and was rather a tired example, as is common with this rifle. Poor maintenance, high humidity, and corrosive ammunition all conspire to result in rough bores on Mexican Mausers. Still the weapon had enough practical accuracy to be deadly out to 400 meters. The shape of the front sight and the narrow notch at the rear make the sights slow to use, and it was difficult to maintain proper windage and elevation. As with all similar-pattern sights, these perform poorly for any action that requires quick firing or that occurs in badly lighted settings. At least, they are graduated for practical ranges.

Recoil is light, as might be expected for a 7x57mm rifle, and the noise level is quite acceptable. The weapon is shorter than the pre-1914 products and, accordingly, is both handier and better balanced for off-hand and kneeling shooting. Overall, I think this represents an improvement over the pre-1914 designs using the same action. The weapon could have been improved by using a better front and rear sight and including an integral cleaning supply, but it certainly was better than what had been offered only 10 years earlier.



The FN-D's low cyclic rate makes it an easy weapon to control while firing, and I like the quick-detachable barrel, but I found this weapon to be too heavy.

FN-D

The FN-D model is the ultimate BAR. It includes all the good points of a BAR and a few that make it superior. The two main improvements are the quick-detachable barrel and the variable cyclic rate.

The barrel on the original BAR was heavier than that on a conventional rifle but much lighter than on an air-cooled machine gun. This, of course, was because the BAR was not envisioned as a replacement for the LMG, but rather as a weapon that would give additional firepower at the squad level and yet would be more foot mobile than previous weapons. Both the Maxim 08/15 and the Lewis Gun weigh 30 to 40 percent more than the early BAR, which weighed only 16 pounds.

Early BARs were designed to be fired in semi or full automatic and were intended in the "machine rifle" role, a job somewhat similar to what a squad automatic weapon would provide today. When placed in this role, it became obvious that the weapon had such a high cyclic rate that to use it effectively—especially given its weight, which made off-hand shooting difficult, a bipod was needed. Hence, the first modification was the addition of a bipod, which added about 2 pounds to the weapon. Once you give a gun a bipod,

people have a tendency to want to grovel on their bellies and shoot them that way. When you do that with a BAR, the barrel gets hot. The 20-shot magazine capacity and slow cyclic rate of about 350 RPM tend to minimize the problem, but it is still there.

With the FN-D model, the barrel is rapidly detachable and does not need to be head-spaced. Merely push the button on the forearm and pull the convenient carrying handle up, and the barrel will come loose. Then, using the same handle, pull the barrel forward and it will come out of the receiver. Drop the hot barrel, insert a new barrel by the handle, and push down on the handle once the barrel is fully seated, and you are back in business. Additionally, the barrel has cooling fins on 40 percent of its length, thereby dissipating the heat more. With two barrels firing on slow fire, you should be able to keep that FN-D in operation as long as you have ammo to shoot. Kent Lomont told me he fired more than 1,000 rounds in a burst as continually as pulling out the empty magazine and sticking in a full one would allow with his model D, and, although the barrel was cherry red, it worked without any malfunction and was as good as new afterward.

The D Model uses the standard BAR gas system, which, although a nuisance to clean when fired with corrosive ammunition, has proven to be a very reliable way to get a weapon to function. An integral bipod is pinned to the weapon. I have tried my FN-D with and without the bipod. Given the D Model's weight, I think I get better results in the prone position and with the bipod.

Sights are typical pyramid front V-notch rear graduated out to 1,500 meters. I am not certain that 1,500 meters is reasonable, but I know that 800 meters is an acceptable range in which to be authorized to attack targets when you want to get some results, not merely to make noise or perhaps randomly kill someone. I find the V shape quite difficult to use and also prefer to paint the top of my sight, which makes it easier to see.

The receiver has a permanently attached dust cover. If you are putting it on with the bolt closed, merely racking the bolt will disconnect it. It is really quite handy and always reminds me of the AR-15 dust covers.

The action is full auto only but with two cyclic rates. The trigger system uses a mousetrap device to create a rate reducer. On

The ratchet system of the FN-D's fire-selector system permits slow fire of about 350 RPM. This is an excellent, if expensive, design feature.

slow fire, it is simple to fire single shots because the cyclic rate is about 300 RPM. On regular fire, the weapon shoots at 650 RPM, and firing single shots is much more difficult. The weapon does not have a semiauto-only setting like the early model BAR had.

The buttstock is of solid wood and quite stable. The pistol grip and forearm are also of wood. My FN-D is a former government of Luxembourg gun and marked accordingly. It originally was a .30-06, but since the FN-D has been manufactured in 7x57, 8x57, and .308, it can be rapidly converted to any of these calibers. Magazines are the same for 7x57 and 8x57 and longer in .30-06, and you use the FN-FAL in the .308 guns.

Magazine insertion and release is always difficult on the gun, in my experience, and you should carefully test all of your magazines. All malfunctions to date have been caused by misshapen feed ramps.

The weapon can be quickly disassembled without tools for full cleaning and repairs. As for a repairs go, between John Ross, who is the foremost U.S. collector of FN-D models, and myself, we have probably put 100,000 rounds through the weapons with no broken parts except an occasional firing pin, which are cheap and easily replaced. Just remember to get a few ahead of time.

I find the grip on the FN-D to be slightly uncomfortable: the wood overlaps the metal pistol grip, and the trigger guard should either be bigger or fold down so that a person wearing mittens can shoot the weapon.

The wood forearm also seems large to my size 9 hands. Given the width of the barrel and goal of preventing the shooter's hands from being burned, this problem may be impossible to resolve.

I like shooting the FN-D because the low cyclic rate makes it an easy weapon to control while firing. The only problem is the weapon's weight. In an attempt to make the BAR more of a squad automatic or platoon LMG, the designers did away with the idea of a light automatic that fired the same cartridge as the service rifle. They made the FN-D heavier, even going so far as to make a bipod and then even a tripod for it. By doing so, one of the greatest virtues of the BAR was lost. The FN-D with its 20-shot magazine is only marginally lighter than the Bren gun, yet has only two-thirds of the Bren's magazine capacity. For a recreational shooter who has access to surplus ammo at four cents per round, as does my friend John, the FN-D makes a nice weapon. I would like it a lot better if I could figure out how to keep the detachable barrel and low cyclic rate, yet lighten the gun by 6 to 8 pounds. Then it would be a weapon that offered a lot to an infantry squad.

FN-ABL

This was the first post–World War II semiautomatic rifle made in quantity by FN. It was sold in the immediate postwar era before the 7.62x51mm NATO round became dominant. For this reason, examples are found in 7x57mm, 8x57mm, and .30-06. The fact that it was able to sell at all in a world awash in surplus M1 Garand rifles that the U.S. government would give free of charge to the same people who bought the ABL is, I believe, a testament to the ability of FN salesmen.

These rifles were commonly made in 7x57mm for the Venezuelan military, 8x57mm for the pre-Nasser Egyptian military, and .30-06 for the Luxembourg military. Except for an occasional Egyptian rifle, most seem to be in very good condition, so I gather that few were ever issued. My test weapon was formerly used by the army of Luxembourg and was so marked. It was chambered in .30-06.

As might be expected, the ABL brings to mind the FAL rifle. Of course, it is stocked like a conventional rifle, with no separate pistol grip, and it does contain a 10-shot magazine that its not rapidly detachable, but the sights and the way it shoots seem very similar to the FAL.

The ABL was designed to be loaded by the use of stripper clips through the top of the receiver. As with the M1 Garand, it could not be loaded when a round was in the chamber.

The FN-ABL semiautomatic rifle was manufactured for the militaries of Venezuela, Egypt, and Luxembourg. This example, chambered in .30-06, was formerly used by the Luxembourg army.

The ABL's safety lever, which is in the "on" position, is slow to remove because it must be pushed up carefully and is almost impossible for left-handed shooters to remove.

Why FN did not make it to accept detachable magazines is beyond me, but I assume that the manufacturer felt that the cost of spare magazines would limit its sales potential in the immediate postwar era.

The stock felt thick in my hand, unlike the stock on an FAL. The safety lever, which pivots on the trigger guard, is slow to remove. You must push it firmly with your trigger finger to disengage it. This would be very slow with cold-stiffened fingers and even more difficult to reapply under similar circumstances. The trigger guard is also small, which hinders operation with mittened hands.

The sights are scaled from 100 to 1,000 meters, which at least shows that FN had recognized finally how infantry rifles were really used in modern warfare. The weapon fieldstrips easily, another characteristic that reminds me of the FAL. Because the weapon uses a gas-operated system, recoil was lighter than otherwise would be expected, although I always am somewhat concerned about corrosive ammunition being used in gas-operated weapons. Unfortunately, the ABL does not have a chromed barrel like the AK-47, so you must use a lot of care when you fire corrosive ammunition to make certain

The 100-yard test target shot with the ABL .30-06. The weapon's primary drawbacks are apparent in this photo: the fixed magazine, the bolt handle on the right side, a safety that is awkward to engage and disengage, and a small trigger guard.

that all residue is out of the system to avoid its clogging up.

The ABL, at least in its Luxembourg army version, has a buttplate trap that contains cleaning equipment, always a good idea in my judgment.

When the FAL first appeared on the scene, it had a wood stock, pistol grip, and forearm. Soon, however, as reports from the field came in, it became apparent that wood in such places is not a good idea. The wood buttstock was last to go, but by the 1980s, wood on the FAL was only a memory.

The ABL might be considered the platform on which the FAL gas system was tested and is perhaps the first modern rifle made by FN after World War II. It has some serious liabilities in its wood stock, its weight, and its limited magazine capacity (exacerbated by the inability to replace the magazine with spares), but these points aside, the ABL is a good rifle.

FN-FAL/L1A1

Blake Stevens, the noted firearms author, calls the FAL "the free world's right arm." Although this may be an exaggeration, certainly the FAL is one of the post-World War II era's most notable designs. From the early 1950s until the H&K G3 began to erode the widespread use of the FAL in the early 1960s, countries seeking to adopt a new 7.62mm NATO rifle flocked to FN for its FAL. Part of the weapon's popularity came from the widespread regard for all FN products (which is not misplaced—FN makes good guns), but the real reason is that the FAL is a good design. About the worst thing anyone ever says is that it is expensive to make. True, but unless you are a really poor country or have masses of poorly trained conscript troops available for you, this is not a legitimate concern.

The furniture on the FAL originally was originally wood, but this soon proved to be too fragile and was replaced by a synthetic product. Occasionally, you will encounter wood buttstocks, but wood forearms are very rare. Today, most rifles seen in active service have a plastic buttstock, which seems to break only rarely, although early British examples were found to fracture frequently. This does not seem to be a problem on Belgian guns or current British models.

The FAL stocks lack a butt trap for carrying cleaning equipment, preferring instead, at least on Belgian examples, to place it in the pistol grip. However, that is only a

pull-through rod, not a real rod like that found on the M14 rifle. On the British rifles, this is even missing. I like having a real rod available and think this is a serious failing.

The FAL also comes in a folding-stock model. As with all such stocks, it helps make a more convenient package but does not help the shooter because the metal tube is hard on the shooter's cheek. Unless space is extremely critical, stay with the fixed stock. Certainly, you never want to carry the rifle into a battle situation with the stock folded because it cannot be shot accurately that way. The FAL folding-stock-lock system is rigid but difficult to disengage, especially when you are wearing gloves or mittens. Care must be taken to avoid pinching the fingers also. I prefer folding stocks that can be opened more rapidly than that found on the FAL: I reason that you may need to open the stock in an emergency but will have plenty of time to close it.

The Belgian FAL pistol grip feels good in the hand, although I prefer the British L1A1-style grip slightly. Most FALs found are selective fire and use a safety/selector combination. British-pattern FALs are semiauto only. On the Belgian-design guns, the selective/safety is too difficult to reach and flip unless you have extremely long and powerful thumbs. I cannot do it without breaking my grip on the weapon and angling my hand so as to allow my thumb to reach the lever. Then it becomes even more difficult to put the safety back on, requiring you to remove your hand from the grip to reapply it. Unless the safety is well broken in, it is also unlikely that you will be able to flip it all the way to full automatic from safe. Considering the lack of controllability in full auto, this may not be a problem, but it is still an unnecessarily long reach to hit the safety/selector with your thumb.

On British-pattern rifles, this is not a problem because of the design of the safety. With an extension on the safety and a large platform to help give you leverage, you can easily remove and reapply it with a normal-length thumb without breaking your grip on the weapon.

This FN-FAL/L1A1 is fitted with a L2A1 SUSIT sight.

British-pattern rifles are generally semiauto only, but many FALs are selective-fire weapons. This is unfortunate because a rifle that weighs as much as the FAL is not really a suitable platform for full-auto fire. The weapon recoils too much, and its rate of fire is too rapid to be effective at anything other than extremely close range. You should always use your FAL as a semiauto rifle and not attempt to use it as an inferior LMG. Firepower, as Melvin Johnson said, is bullets hitting people.

The forearm on the FAL frequently has a heat deflector built into it, but not always. I prefer the models that do, having found that even four fast 20-round magazines fired through the weapon will get it so hot that it is almost impossible for me to hold. With the heat deflector in place, you can almost double the rounds fired before reaching that stage. Unlike the awkward shape found on the G3 tropical hand guard or the M16A1 rifle, the forearm on the FAL feels good in the hand. It is small enough that you can get a firm grasp on it.

This cutaway photo illustrates the right side of an FAL's action.

Sling swivels on the front of the rifle swivel nicely and would normally be useful for carrying the weapon slung over the shoulder for long marches while still keeping the weapon at ready. Unfortunately, the rear stock swivel is on the toe, and you will encounter the weapon flipping over when you attempt this so-called assault carry.

The FAL has a very nice gas system. On the earlier weapons, the regulators on the gas system were carefully marked with figures and then painted so you could see them. On the later versions, the regulators were unnumbered, but the adjustable gas system remained. It is always possible that an ill-trained soldier might play with the gas regulator, resulting in too little gas getting to the weapon and, thus, a malfunction, or that he will leave it too open, causing the mechanism to become battered. The well-trained soldier, however, can use the adjustable system to compensate for climactic conditions, poor ammunition, and heavy fouling resulting from extensive shooting with little opportunity to clean the weapon. Because of the gas-operated system, the recoil impulse is both lighter and smoother than on weapons like the G3, which dispense with gas operation. I find the FAL's gas system with its option to alter the gas flow superior to the nonmodifiable M14-type system.

Barrels on the FAL rifle come in a variety of lengths, from as short as 16 inches to the more standard 20. They also come with or without a flash hider and with a variety of flash hiders from the very short, fat one installed on current production weapons to the original long, thin unit. All such flash hiders add weight and length to the weapon. With the short-barreled weapons, flash hiders serve a useful purpose. Testing both versions at night, both from the front and back, they seem to be about equal in lowering the flash. The shorter flash hider keeps length down and is useful with some grenade launchers if you think such things are practical. Given the advent of the M79 40mm grenade launchers, I am unconvinced. I find that the weapon balances much better with the short barrel installed. My preference, in fact, is the short-barreled rifle, typically used with a folding stock, but instead fitted with a full-sized standard fixed stock.

The front sight of the FAL is adequately protected by rather massive wings, but the round front post does not give as clear a picture as the blade front found on the M14 front. It seems to be rugged, however, and I would imagine that it would be highly unlikely for you to drop it hard enough to bend it. I have never seen one so bent.

To cock the L1A1, pull the folding cocking lever out and pull the bolt to the rear. By having the cocking handle on the left, the L1A1 allows the shooter to keep his hand on the pistol grip while loading his weapon.

The cocking handle on the FAL is located on the left side of the weapon, which makes it possible to cock the weapon without removing your hand from the pistol grip. Although this is a nice touch, I prefer the Galil, with its cocking handle that can be used by either hand. Try cocking your FAL with your right hand sometime and see what I mean. It is true that the FAL can be fired from either shoulder, which is always very helpful in urban combat scenarios, but it is difficult to remove the safety when you put your left hand in the pistol grip, unless you are using the British pattern of safety. It is really better if you can remove the safety from either side of the weapon or if it is centrally located as exists on the M14.

The action remains open when the last shot is fired, alerting the shooter to its status. This feature is desirable in a battle rifle because it speeds up reloading and prevents your pulling the trigger on an empty chamber. The centrally located magazine release is helpful, although the larger release found on the British pattern L1A1 is faster to operate and more certain than the type found on standard FAL rifles.

The rear sight of the FAL rifle has always seemed somewhat fragile to me. It is subject to being hit by a variety of objects and of being bent if the weapon is dropped. It also seems to work loose. I have seen a number of them over the years that needed to be shimmed to stay in position—not a very encouraging situation. The adjustments on the rear sight are also much more coarse than those found on the M14, and in some models they are fixed sights (paratroop-model rifle). I think a firmly fixed rear sight that actually hit to the POI would be acceptable as long as the shooter never anticipated firing at extended distances. I realize that studies show that most shots are fired within 300 meters and that 97 percent are fired within 400 meters; still in certain situations, the ability to elevate the POI might well be useful. After all, delivering power at a distance is one of the reasons we all use rifles. Without some means of adjusting the sights, you must use rough elevation techniques. They rarely work as well as adjusting the sights properly once we get out beyond 400 yards. Further, I have some real doubts that any fixed-sight rifle will really hit the proper place for the shooter every time. The factories do not do it with handguns, and the margin for error is much bigger with rifles because they are used at longer distances. If they would be properly zeroed, such sights would be fine; however, I would have to see it to believe they are really properly calibrated.

My experience with FAL rifles has led me to conclude that they are generally less

These Israeli soldiers in the 1956 Sinai War with Egypt are armed with an Uzi SMG (foreground) and a FN-FAL rifle (background).

accurate than M14 rifles. They seem to go about 2 1/2 inches at 100 yards as long as the rifle is in good condition. I put part of the blame for the FAL's inferior performance on the front sight, which is harder for my eyes to use than the blade sight of the M14. But most of the problem is caused by the trigger pull. No shooter does his best work with a mushy trigger pull with overtravel. Since most of the FALs seen are selective-fire rifles, they tend to have heavy, gritty pulls. You thus have to really fight to get a good target fired. Although substantially better than triggers on the G3, they fall short of those found on the M14. If you try to fix the pull, you will start getting follow-through with its resulting malfunctions.

The FAL is a good rifle, and it has secured itself a niche in history. Despite the fact that no major wars were fought with it, this rifle kept the peace in many faraway places in some very tense periods in history. It faced off the Soviet hordes in Europe starting in the 1950s, and no one who has ever used one will doubt for a minute that it would have served NATO well had the Soviets decided to start their lemming-like run to the English Channel. Its day in the sun may be over, but it will bask in its reflected glory until the first decade or two of the 21st century, if my guess

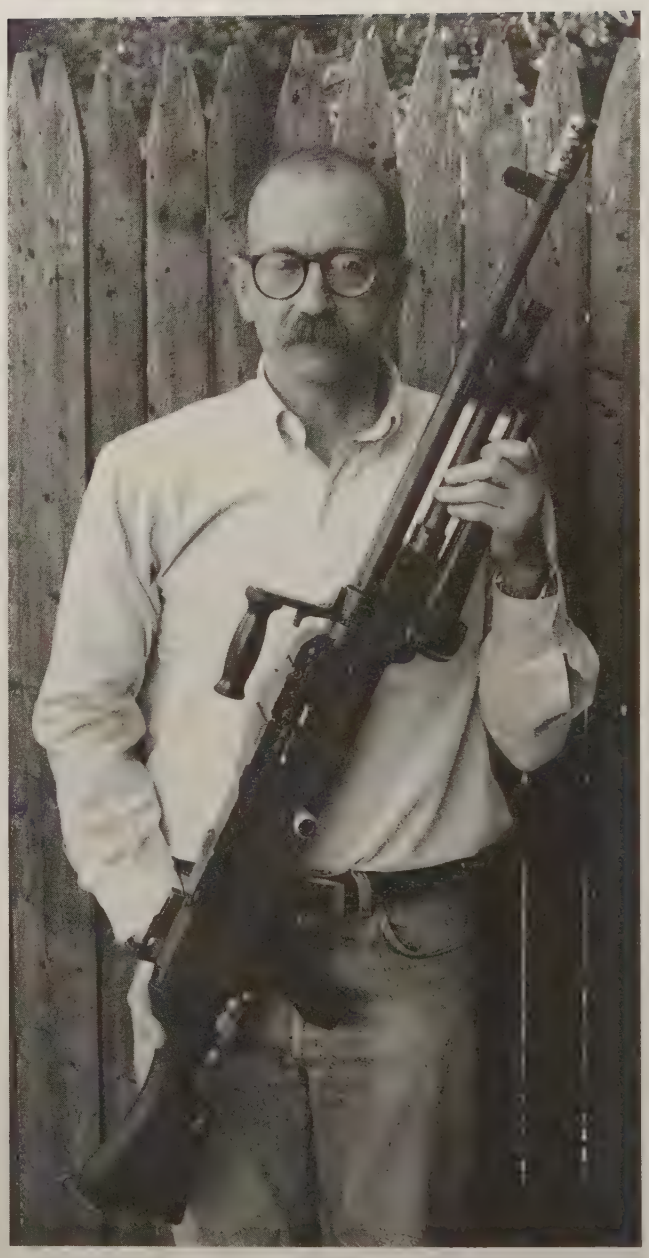
Selous Scouts in Rhodesia practicing antiambush drill with FAL rifles.

is anywhere near correct. Whether it will still be knocking around 100 years later, as Mauser M93/5/8 rifles do today, may be more a matter of cartridge technology than weapon design.

FN MAG—7.62MM

The FN MAG is one of the three major machine guns of the post-World War II era in the West (the other two are the U.S.-designed and -built M60 and the German-designed MG3, a postwar modification of the MG 42, with the only real change being a caliber modification to 7.62x51mm from the MG 42's 7.92x57mm). This general-purpose machine gun (GPMG) has been used from the Arctic to the desert by extremely well-trained professional soldiers, such as the British SAS, as well as ragtag guerrillas in Third World rebellions. In no place has it been found wanting.

The MAG's two main competitors in the West, the MG3 and M60, are not as well regarded by people who know enough to have an opinion worthy of consideration. For example, the MAG is so far superior to the U.S. M60, which the U.S. military limped along with during the Vietnam War despite numerous attempted "fixes," that it is being used by U.S. troops both in the vehicle and ground role. The M60, of course, is the worst of the three: it has a sear system that will result in runaway guns about every 20,000 rounds, a barrel that lacks a handle in early models and on late ones still is not easy to adjust for impact, and—worst of all—parts that can be assembled backwards, resulting in a gun that will stop after one shot and then must be stripped to get the parts straightened out. Try that sometime with the North Vietnamese Army climbing over your position at night and you will soon be a believer. The MG3, on the other hand, fires too rapidly, up to 1,200 RPM in some examples, and because it uses a roller-lock system it can be dangerous if you are using old or poorly stored ammunition. Frequently, worn MG 42s will blow up from that cause,



This MAG 58 light machine gun from the John Ross collection sports a McArthur muzzle break.

while the FN MAG keeps on going along.

The worst thing that I can think to say about the MAG is that it is heavy and rather ill balanced. I cannot shoot it from off-hand from the shoulder, although kneeling is possible for short periods. It is best fired from the prone position from its bipod or, better yet, tripod. It has a titanium tripod that is no doubt very expensive to make but which is

quite pleasant to carry, when compared with steel units. Unlike German tripods used with the MG34/42/3 guns, the MAG's tripod is simple and straightforward.

The MAG is a gas-operated gun but has adjustments to compensate for fouled conditions or weather. By using its sturdy handle, the barrel can be quickly removed without touching it and just as easily installed. No head spacing is necessary, nor do you need to fish the barrel out with your fingers as you do occasionally on the MG 42/3 guns. It is a sturdy and well-built gun. My friend Kent Lomont has a number of MAG MGs. Naturally, his "shooter" is a post-May sample gun. (It is so-called because it was imported into the United States as a dealer sample for potential police sales. As such, it is much less valuable than a transferable weapon that was imported and registered prior to 1968. Post-May 1986 imported mcahine guns can only be sold to licensed dealers to be ussed as samples or to law enforcement agencies. They must be surrendered if a license is terminated. As a consequence, the weapons have a substantially lower market value—a typical market dislocation caused by the government.) He has put 250,000 rounds through it without breaking a part. I have seen him fire it continually on full-auto burst until the entire barrel all the way out to the end turns red, as if heated with a torch. The last time I saw his gun in operation he had a barrel that had been fired so much that there was literally no rifling left in it—it was completely smooth bored. It takes a fast 30,000 rounds or more to do that.

Removing or installing the barrel on the FN 58 MAG is quiet and easy. In this photo, the barrel is being removed: as the thumb pushes the release button, the barrel can be moved forward and removed easily with the handle so that the barrel itself does not have to be touched.

The sights on the MAG are quite good, offering as it does a peep rear sight on the tangent. But you should take the time to carefully sight in your weapon and its various barrels before you take it to the field. It will be time well rewarded.

The weapon will use either German MG3 belts or M60 links. I prefer the M60 links; that way you can put a short "cheater" belt in it for carry in the field. The cyclic rate is low enough that it is no trick to fire single shots, and naturally 3- to 5-shot bursts are easy to maintain, something you cannot say about the MG3. Also unlike the MG3, the MAG does not bounce around as you fire it; rather, it seems to smoothly fire its rounds. Perhaps it is the MAG's deeper receiver that ensures this.

The pistol grip is well shaped. Although the weapon does have a push-through safety that can be operated with the thumb if you really try, it is not really convenient, and I do not trust safeties on open-bolt guns. Ignore it and rely on cocking the weapon when ready to fire.

Most MAGs made have been in 7.62x51mm,

but early on Sweden adopted this weapon in 6.5x55mm. I have never tested one in that caliber, but I would like to try it because the lighter recoil impulse of 6.5x55mm would no doubt make this very controllable weapon even more so—and a joy to shoot.

As with any 7.62x51mm LMG, except possibly the H&K 21, the MAG is really too heavy to be used at the squad level, but a couple of them at the platoon level could be very valuable for defending against night assaults or for springing ambushes.

With a MAG you may not be carrying a weapon as light and handy as an H&K 21, but you are carrying something that will not let you down and something that can be depended upon to rain deadly accurate and easily placed fire out to 1,200 meters. Such thoughts after one or two experiences with lesser guns (assuming you survive them) tend to lighten the burden considerably.

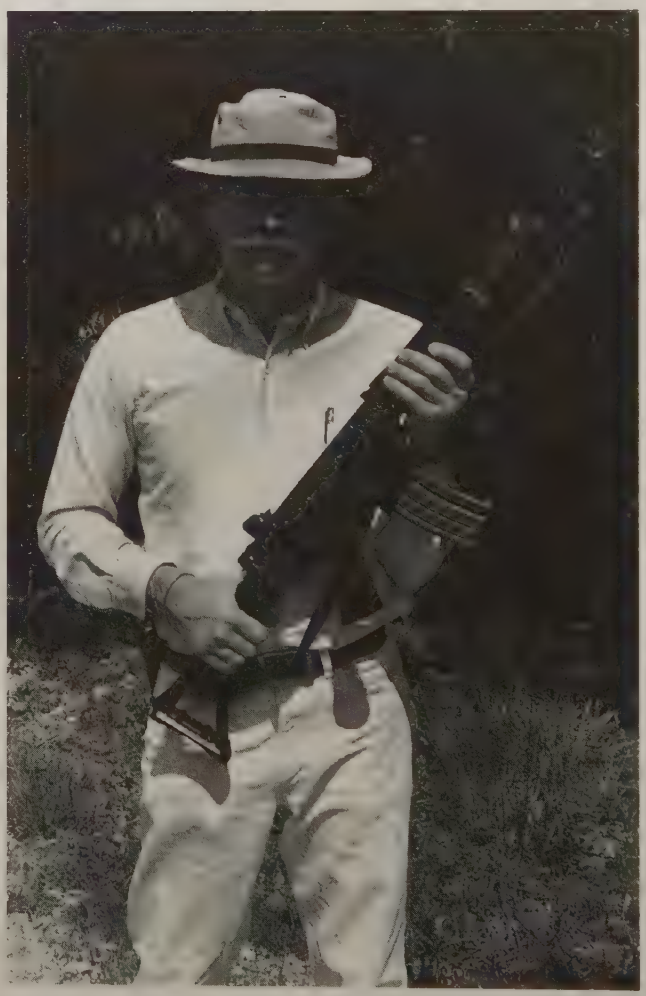
FNC

When the United States managed to convince its NATO allies to accept the 5.56x45mm cartridge as the new standard, the question immediately arose as to what weapon would be used to fire it. Many European countries had excellent firearms manufacturing plants, and these nations were reluctant to adopt the U.S. M16 rifle. Quite intelligently, the NATO nations agreed to adopt at least a common magazine so that development and administrative expenses would be reduced.

Belgium with its long history of gun making modified its FAL 7.62x51 NATO rifle to the new cartridge and called it the CAL. This rifle proved to be too expensive for current production methods and soon was replaced by the FNC model, which was easier and cheaper to make than the CAL rifle. The FNC became the new Belgian service rifle.

The model I tested was an early example with a 1-in-12-inch twist rather than the current faster-twist barrels, so I could only shoot M193 ammunition in it. However, it was quite accurate out to the 300 yards I had available to me. This is the same accuracy as with an AR-15 rifle, using the same ammunition. It is the sights and trigger pull that limit the accuracy of the weapon, not any inherent inaccuracy of the design.

Perhaps starting at the muzzle and working backward would make the best sense when evaluating this design. The rifle has a rather involved muzzle-braking flash hider and grenade launcher combination. I suppose it works well. Obviously, the muzzle-brake aspect is not so critical unless you fire the weapon in burst. No shoulder-fired weapon is totally suitable for burst fire, so I view this as a marginal concern. As a flash hider, it seems to



The excellent handguard on the FNC 5.56x45mm rifle tested protects the nonshooting hand even when firing rapidly.

work; I do not recall seeing any flash from the barrel, although I admit I did not test it at night. I did not have any grenades to test that feature.

The sights are a typical cylindrical post, which adjusts for elevation by screw threads. The front sight is protected by wings that seem to be set farther apart than the wings on the M16 front sight, thus eliminating the problem of the shooter picking up a sight wing and mistaking it for a front sight. Do not laugh—it can happen, especially in darkness and when the shot is rushed. Needless to say, your shots will be way off. Of course, I suppose a slightly greater risk of damage exists, but overall, I believe the extra risk is minimal and the benefit worthwhile. The rear sight is adjustable for windage only and is protected by sturdy wings. It has two peeps: one for 250 and one for 400 meters. With M193 ammo, I am uncertain that you need the 400-meter peep, but I suppose most will leave the sights set on the 250 peep. No night sights were provided on the example tested, but it would not be any trick to set them up with the system.

The bolt handle is on the right side and is curved upward so as to allow it to be cocked with either hand with equal facility, always a good feature. Many rifles have a dust cover that snaps open when the first shot is fired, such as that found on the AR-15 or AR-18. On the FNC, the dust cover is attached to a spring. As the bolt travels to the rear, the cover flips down to allow the bolt to clear it, and, then as the bolt goes forward, the cover returns to its original position. By doing this, the weapon is better sealed against dirt or water because the opening does not remain open. Of course, it also is just one more part to break because the spring is compressed and extended each time the bolt comes back. I suppose the worst that can happen is that the spring breaks and then the cover will not return to the closed position unless the shooter manually pushes it back, just like on the AR-15 or AR-18 system. That being the case, the benefits seem to outweigh any potential drawback.

The front sight on the FNC is well protected by wings. The front rounded post is better than a pyramid sight but not as good as the flat blade on the M16A2 rifle. The flash hider doubles as a grenade launcher.

The FNC uses M16 magazines, which is nice because they are so widely available (although the magazine that came with the weapon was actually a steel magazine of the same design). Europeans seem to have trouble with aluminum magazines. The magazine release is actually set up for right-handed shooters, but by wrapping your fingers around the front of the magazine well, it can be released with the other hand. The selector/safety is similar to that found on the FAL, as is the pistol grip. It is not as easy for the left-handed shooter to disengage as it would be for someone ambidextrous, but by using your index finger to push down before contacting the trigger, it can be done somewhat rapidly. The pistol grip contains a trap in which to put a pull-through, brushes, and oiler, just as on the FAL rifle. Although I do not think a pull-through is the equal to a cleaning rod, especially for small-caliber rifles, it is better than nothing. The magazine well

should be flared to allow more rapid insertion of the magazine when speed is critical.

Trigger pull on the FNC tested was no better or worse than what one has come to expect from such rifles. It is spongy and has creep and overtravel. Except for the SIG STG 90, none of the 5.56x45mm rifles tested have really good trigger pulls.

The FNC comes with a fixed fiberglass stock or a folder. The folder is a tubelike creation that is comfortable on the cheek only because of the low recoil energy of the caliber used. The lock on the stock is also excessively involved. You must push the button in and push down on the stock while you swing it open. Doing all three things simultaneously is not easy, and you tend to pinch your fingers if you do not watch out, which I have done more times than I would like to admit and must say it hurts. The trigger guard also does not swing down or to the side, so winter use of the weapon is more difficult than necessary. Unless size is really critical, a person would be better to adopt the fixed-stock weapon; although, once opened, the folder is quite rigid. Sling swivels on the stock are conveniently placed for over-the-shoulder carry; there are two swivel locations for the real sling swivel available.

The forearm of the FNC is quite nice: it is better protected from heat than many such units but still not so bulky as others. It can be conveniently grasped, and yet even 100 rounds fired rapidly through the weapon will not get it too hot to hold. FN basically took the design of the forearm of its FAL LMG version (the heavy-barreled FAL), used synthetic material, and came up with one of the best forearm designs around. However, it should have covered the gas tube: if you grasp the weapon around the top, the gas tube will burn you even though the barrel does not. Had the forearm gone over the gas tube, this problem could have been avoided.

The FNC is a well-made, reliable weapon that is as easy to use as an AR-15 or M16A2 rifle. This FNC military rifle has a three-shot burst system, as does the M16A2, which I find rather useless, and for that reason I prefer the semiautomatic-only version, just as I prefer the AR-15A2 Government model to the M16A2. Although the FNC has not been used in combat as much as the M16A2, there is no reason to believe that the engineers at FN are not capable of combining the lessons learned with the M16 rifle in combat with those learned from the combat use of FN-produced rifles for more than 100 years in order to develop a very reliable 5.56x45mm rifle.

Canada

ROSS MK III (M10)—.303

Testing this rifle was a matter of contrast. On one hand, as I shot each round, I thought of the reason the Canadian army withdrew this weapon from service in France during World War I: the bolt blowing out of the action and into the eye socket of the shooter. On the other hand, Herbert McBride, who wrote the classic *A Rifleman Went to War*, used the Ross for most if not all of his sniping exploits and thought it was a wonderful, accurate rifle.

I am happy to report that during my testing of the weapon the bolt did not blow out, so apparently it was assembled properly. But I did not get the gilt-edge accuracy McBride wrote about. I fear it was my concern over the bolt issue, but it may have been the sights, which were well worn and tended to wobble about some. As it was, I got a 2 7/8-inch group at 100 yards with Greek 1970s' military specification ammunition. I think the rifle could do better if I shimmed the sight and could convince myself all was well on the bolt assembly.

The potential is there, what with a long sight radius, a peep rear sight located close to the eye, a front sight that is square on its face and flat-topped, and a genuinely excellent trigger pull that is as good as that on my M700 Remington sporter. As a result of the

A Canadian soldier armed with the Ross M1910 rifle in World War I.

weapon's weight and long barrel length, both recoil and report were light, making it a pleasant gun to shoot. Despite the length, the weapon balanced well, which made off-hand shooting quite easy.

Perhaps the major problem with the Ross—except the bolt difficulty—is the fact that with the peep sight up, there is a gap between the sight and the base where the sight is mounted. The comb of the stock is low, which causes me to have to raise my head to allow my eye to see through the peep, and, unfortunately, the gap is almost the same size as the peep. My eye kept catching the gap before it was raised high enough to see through the peep, and this resulted in my occasionally using the gap as the peep sight. This problem was especially pronounced when I was shooting rapidly, and I would imagine that shooting in the dark would make it even more so, although, admittedly, more experience on my part would allow me to overcome the problem. I think, however, I would try to plug the gap in some way to avoid the problem, which obviously results in totally improper sighting. With the peep sight down, the problem disappears, but then you are using an open-notch rear sight that is placed too close to the eye for best results. This is not a great solution; plus the sight is not adjustable, as is the peep sight, so the POI is likely to suffer.

Prior to my research for this book, I had never shot a straight-pull rifle, although I had handled them, and I really did not appreciate them. I was very surprised with the results. They are very fast. McBride and others always said that the Ross was very fast, and I can well believe it. With a straight-pull rifle, you avoid two of the steps you encounter with a standard bolt action: lifting the handle at the beginning and pushing it down at the end.

I have read often that straight-pulls lack the camming power to extract or seat dirty or oversized cartridges and will not work as well as standard bolt actions in the mud or sand. Perhaps that is true, but I wonder how much mud or sand we are talking about. Further,

Top view of the M1910 showing rear sight and safety. The shooter's thumb is getting ready to flip the safety off.

cartridges today are much more uniform in size and quality content. If it were not so, the autoloading weapons we see would not work. After all, the autoloading actions are themselves all straight-pulls but powered by gas rather than elbow power. I would agree that perhaps with poor-quality ammunition or extremely dirty situations, the straight-pulls might not work as well as the M98, but I think they would work fine under any conditions where an M14 or M16 would work.

These straight-pull rifles are all much faster than even the slickest bolt actions, such as Krag, and are so far ahead of Mausers and Mannlichers that it is not even fair to put them in the same league. If you have not tried one, you are missing a very fine piece of equipment. I think so well of them I am going to have a "Cooper-style Scout" built in a Swiss K-31 action, and I anticipate that I will have the slickest "Scout" made.

Chile

SIG-AMT—.308

The Swiss Industrial Group (SIG) is, of course, well known around the world for its excellent small-arms workmanship. Unfortunately, because of severe Swiss firearms export laws and the unusual caliber of the previously standard Swiss military cartridge (7.5 Swiss), many of the long arms produced by SIG are not very well represented in the world's armies. Of course, the rifles are expensive, especially when compared with free or greatly subsidized weapons such as the M16A1 or AK-47. But SIG produces fine rifles and LMGs both for home consumption and overseas sales upon occasion.

The SIG AMT is basically a modification of the standard Swiss service rifle, the PE 57. It is, however, lighter in weight and chambered for the 7.62x51mm NATO round, which is nearly universally available in the Western world. Although this weapon is familiar to many as a semiauto target rifle offered for civilian sales, it has also been adopted by some military forces to one degree or another; therefore, it is legitimate to include this weapon in this volume.

Of course, the most notable use of the AMT is by the Chilean military. At one point, Chile was apparently cut off from U.S. suppliers and somehow persuaded the Swiss to allow the export of the AMT for the Chilean military forces. It would be interesting to know what the Chileans gave the Swiss to agree to this. I would imagine some type of barter arrangement involving natural resources that are available in Chile, but perhaps it was just a smooth-talking salesman. In any event, Chilean soldiers who do not make as much in a year as an AMT costs will frequently be seen carrying these rifles.

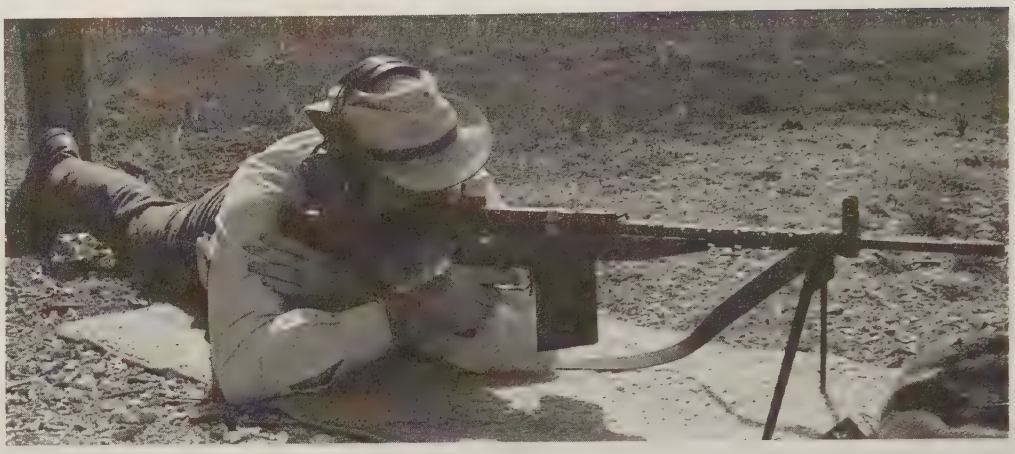
The PE 57 is a very heavy rifle, weighing almost as much as an LMG. In fact, it might be considered more of a machine rifle than a rifle. The AMT, though based on the PE 57, is much lighter, is more pleasant to carry, and balances much better when shot in the off-hand position.

The stock is very straight, and the sights are perched on top of the receiver. Because of the design, I found it difficult to get a proper stock weld and, unlike with most rifles where I have to raise my head to see the sights (e.g., the AMT), I had to force my face onto the stock to get my eye low enough to properly align it with the sights.

The AMT, as does the PE 57, uses the roller lock system, and, as a consequence, the recoil impulse is heavy and jarring. Thus, even though the recoil level would be expected to be low as a result of the caliber, weapon weight, and stock design, because of the locking method, the roller lock guns always seem to have a disproportionate recoil level.

Another unfortunate feature the AMT shares with the H&K-designed rifles is the

lack of a hold-open device. When the last round is fired, you are left with an empty chamber and only a "click" alerts you to the condition of the weapon. This is a serious flaw that clearly slows up reloading and may cause real problems in combat.



Firing the SIG AMT 7.62x51mm rifle on the bipod from the prone position.

The AMT offers a folding handle to allow the weapon to be carried in the field much like a suitcase. SAS troops cut off the handles on their L1A1 rifles to avoid the rattle, and I would assume anyone well trained and serious would remove them from their AMT rifles as well. Why designers think a combat soldier would wish to carry his battle rifle like a suitcase is beyond me. Such handles make some sense on a 20-pound-plus LMG, but not on main battle rifles. The AMT did not rattle too much, however, except for the carrying handle, and the magazine in the magazine well rattled somewhat. I suppose quality Swiss construction minimized the rattles.

The bipod fitted to the weapon added substantial weight to the overall package, and I would take it off and save the weight—I have never yet found grass short enough to allow me to use a bipod on a rifle while in the field. Others' experiences will differ, obviously. At least the bipod folds back on the top of the barrel rather than underneath it, as on many rifles, which of course merely makes the forearm broader and harder to use effectively. To deploy the bipod, flip it out and then swing it under the barrel.

The rifle has a cleaning kit in the grip, and although it is only a pull-through, it is better than nothing. A better solution would be a jointed rod in the buttstock, as on the M14. As might be expected for a Swiss rifle, the AMT has an excellent winter trigger guard that folds down and allows easy use with mittened hands.

The front sight is a cylindrical post, which is well protected by heavy wings; whereas the rear sight is much like that found on the FAL: an unprotected peep unit. Unlike the PE 57 sight, it does not fold flush on the receiver for carrying and could snag easily. It is graduated in 100-meter increments and lacks the fine adjustments that the PE 57 offers and what I have come to expect on Swiss rifles generally.

The safety/selector is located on the left side and is very slow to remove. I could not remove it with the firing hand without removing my hand from the grip. It is also difficult to remove with the nonfiring hand. The safety/selector is simply too slow to allow rapid disengagement. I would imagine most soldiers simply leave the safety off while on patrol if they expect any close-range encounters—hardly a satisfactory solution. If anything, it is slower to remove than the safety/selector on the AK-47 and certainly cannot compare to the safety on the M16, M14, or L1A1 rifle. It seems likely that Swiss designers did not get too much input from soldiers who patrolled in the jungle and had to instantly engage a North Vietnamese Army soldier at 10 yards. Had they gotten that input *and listened*, the safety would be different.

The magazine release is centrally located, which is good, but the lever is too short for quick, certain release in good weather. With

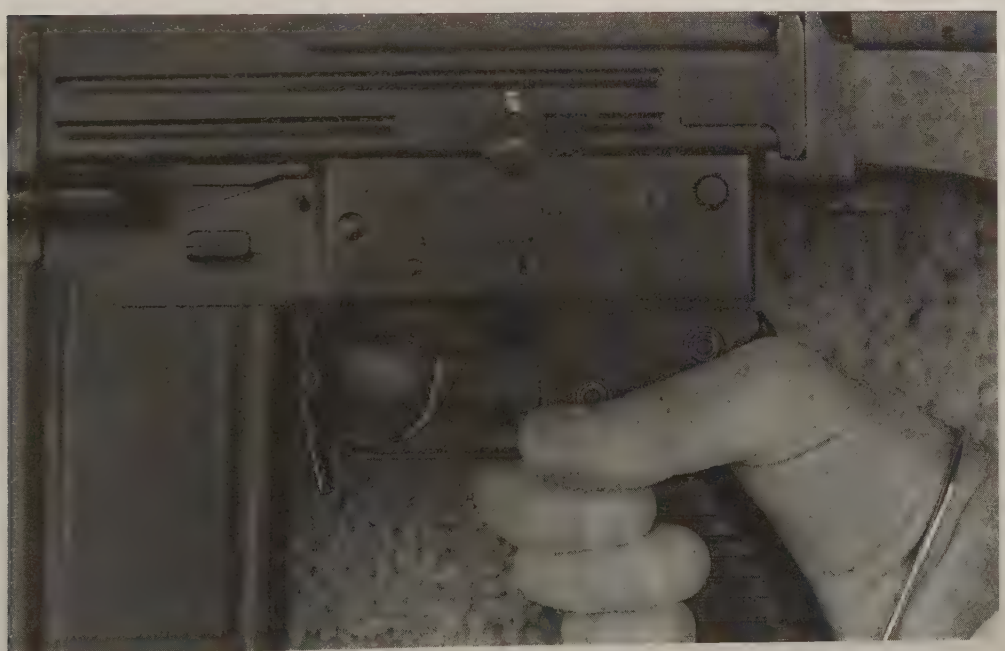
mittens, it would be worse. The lever needs to be extended by at least 3/4 inch to make it faster and more certain.

The flash hider seemed effective but was open on the bottom, allowing quite a lot of gas to escape so that dust and sand were kicked up. It was so intense that the gas cut open a sandbag underneath the muzzle when I was testing the rifle.

The trigger pull is surprisingly heavy. Generally, all SIG weapons have excellent trigger pulls—even the SIG 550 (STG 90) has an excellent trigger pull—but the AMT seems heavy and gritty. Although not as bad as the H&K G3, it comes nowhere near the FAL standard, much less the fine trigger pulls on the M14 rifle. A good trigger is one of the most important features in obtaining practical field accuracy, and this drawback with the AMT is notable.

The pull required to pull the bolt to the rear to cock the weapon is quite heavy, and the design and location of the cocking handle is such that it is impossible to pull it to the rear with the left hand while maintaining a firing grip with the right. If the handle were longer on top at least, angled slightly, and perhaps checkered, it would have been possible to pull it to the rear with the left hand, but given the small size and polished aluminum surface, this proved impossible for me. The shooter thus has to remove his hand from the trigger area to cock the rifle. When you recall that the rifle lacks a hold-open device, it is apparent that this strong-hand-only cocking method lacks something critical. I also cannot help but wonder why the designer used a polished-aluminum bolt handle. I would be compelled to paint it if I took an AMT to the field.

The AMT has a nice, small, wood forearm that gives it a distinctive look, along with the well-ventilated barrel jacket. The barrel jacket, of course, keeps the soldier's fingers off the hot barrel, but I imagine that it must be very difficult to clean the barrel exterior properly with the barrel jacket on—especially if the rifle is dropped in the mud. Dropping it in the snow would not be as big a problem since you could shoot it hot enough to dry the water off, but the mud would really fill the vent holes. It rather reminds me of barrel jackets found on the Belgian M1888 rifles. I could live without the barrel jackets: a lot more maintenance for a very marginal benefit on an infantry rifle.



With the hand in the firing position, you can see that the shooter's thumb cannot flip the safety off because it is too far. To reach the safety, which is located on the rifle's left side, the shooter must take his hand from the grip.

If all of this sounds as though I do not like the AMT rifle, you are mistaken. It is a very well-made rifle. It lacks, however, the refinements of a combat rifle. Before modifying the PE 57, SIG representatives never sat down with

the users of the weapon to determine what features were missing or undesirable on existing rifles in order to create a better rifle. Instead, it created what might be a fine rifle for the Chilean military, which needs only to have weapons to intimidate its own unarmed citizens. The AMT cannot be viewed as equal to the time-tested world standards.

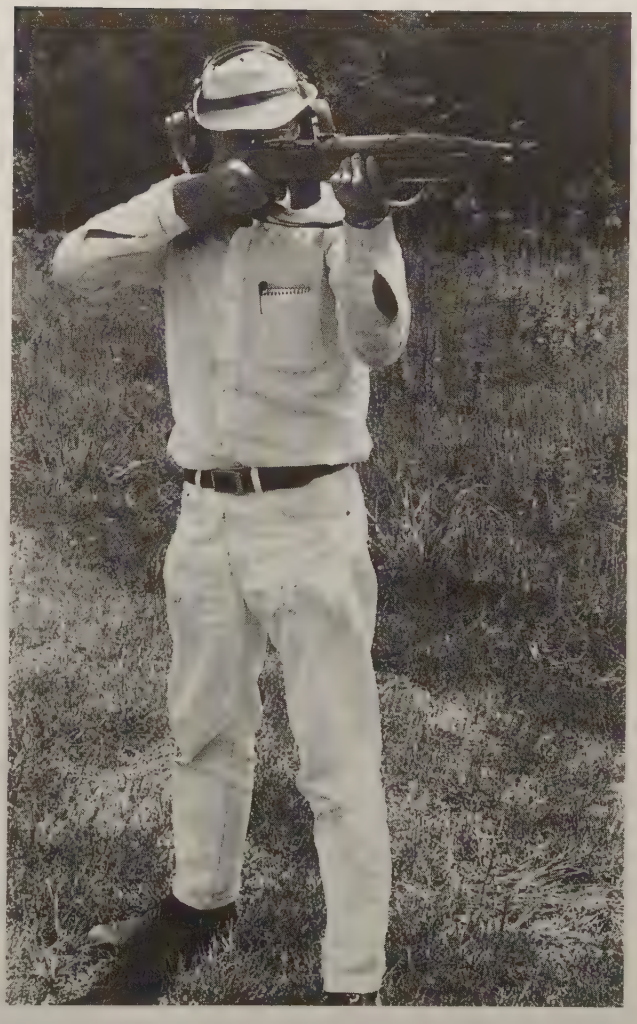
Czechoslovakia

VZ 52/57—7.62X39MM

Most of us are familiar with this weapon from its use by the various militia groups in Cuba. Apparently Czechoslovakia decided that Cuba was a great area to dump these weapons, which had been replaced by the Vz 58 at home.

Two versions of this weapon exist: the Vz 52 chambered for the 7.62x45mm round and the Vz 52/57, which is the same rifle but chambered for the Soviet Bloc standard cartridge, the 7.62x39mm. As most students of small arms realize, Czechoslovakia had some independence in small-arms design that was denied to other Soviet satellite countries. Instead of copying Soviet patterns, Czech arms makers developed their own. Frequently, these were not even Soviet calibers, but generally they would eventually be modified for Soviet standard cartridges. Still, they were unique designs found nowhere else: the CZ 23/26 SMG, Vz 52 pistol, Vz 52/57 rifle, and M62 Scorpion.

The best way to consider this rifle is as an SKS-style weapon. It shares many of the same features but is better in certain areas. Testing the weapon got me a 3 1/2-inch, 100-yard group, which I thought was merely adequate. Interestingly enough with the bayonet extended, the bullets hit about 1 1/2 inches lower on the target, although the group was the same size. The sights consisted of a nicely hooded front blade coupled with a



The Vz 52/57 is an SKS-style weapon, but it has distinct advantages over the Soviet rifle: it has a faster safety and uses a quick-detachable magazine.

ramp-style rear that had a U-shaped rear blade. I found centering the U-shaped blade and keeping the proper elevation difficult. Opening it up to a wider, square-type blade would be a substantial improvement, and even better would be a peep rear coupled with white front sight. But, alas, neither is to be with the Vz 52/57.

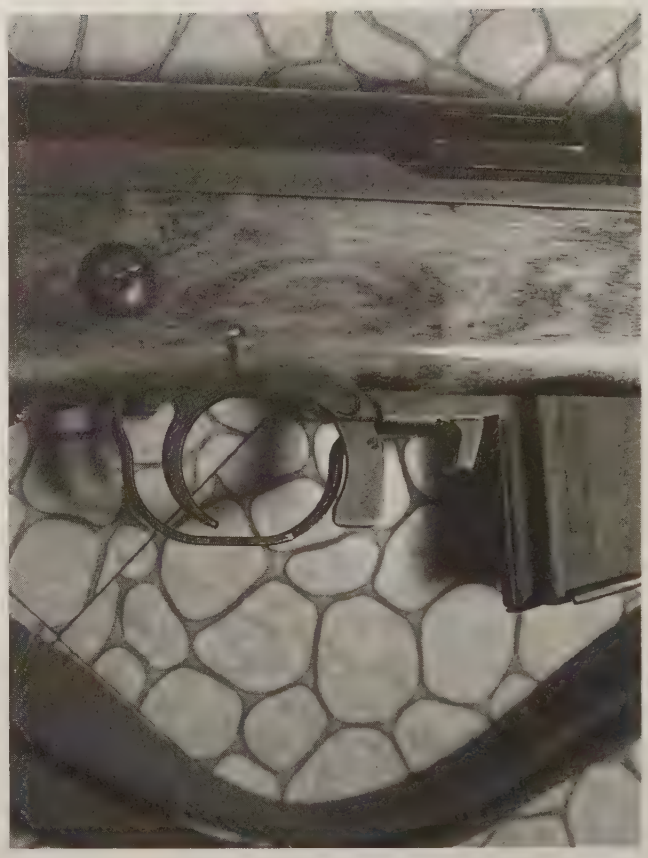
The weapon recoiled lightly, as might be expected with the cartridge being fired. The weapon is slightly muzzle heavy, which also controls muzzle flip, but makes off-hand shooting more difficult than it needs to be, in my judgment. The metal handguard seemed to be loose on the example tested, which was nearly new. I imagine that on a well-worn piece it would rattle a lot. This can be a dead giveaway at night, and even in nearly new condition the Vz 52/57 would not pass the standard "jump test" for night patrols without taping the handguard down a bit.

The safety is much like the one found on the M1 Garand, and it can be easily disengaged or engaged. In operation it is fast and certain.

The trigger is also good, especially for self-loading rifles, whose triggers often leave a lot to be desired.

The Vz 52/57 uses a detachable magazine, but the rifle was not really designed to use them for reloading purposes. Instead, stripper clips are to be used with the slot on the top of the receiver to load the magazine. The Czechs missed a real opportunity here: they should have designed the weapon to accept the AK-47 magazine and then supplied the soldier with six spare magazines and ignored the stripper clip idea. Had they done that, they would have been ahead of the Chinese Type 68, which is a magazine-fed selective-fire version of the SKS rifle. The method by which the weapon is to be reloaded reflects fuzzy thinking on the part of the designers, who apparently had not figured out what was going to be required of post-1945 infantry weapons.

I shot this weapon in the summer while I was wearing a thin cotton shirt, and the stock



The safety on the Vz 52/57 can be quickly flipped on or off with the trigger finger (shown here in off position). The magazine release is short and slow, betraying the design's intention to have the weapon reloaded with stripper clips rather than spare magazines.

was short for me, but it would be just right with bulkier winter-weight clothing. Given a choice, I would always prefer the stock to be too short than too long because you can work with a short stock, and, as mentioned, it will work better in cold weather. A long stock is difficult to use in any way, and winter conditions only make matters worse.

A factor to be considered is that this rifle ejects to the left, which is the opposite of most rifles. Despite this, I found that I could shoot the Vz 52/57 from my left shoulder as easily as my right. This is always a good feature for the 11 percent of the population who are left-handed or for occasions when you want to fire down the street and your

left side is nearest the street. By firing with your off-side shoulder, you can fire without exposing yourself as you would be forced to if you could not use the rifle from the off-side shoulder.

Given a choice between a Vz 52/57 and a standard SKS rifle, which both use the same cartridge, I prefer the Vz 52/57 because of its quick safety and the rapidly detachable magazine. At a minimum, I would get six or so extra magazines to keep my rate of fire high. After the fighting was over, I could use my time to load them up with stripper clips.

ZB 26 LMG—7.92MM

This LMG is the forerunner of the famous British Bren LMG, and it has many of that weapon's excellent features. Examples of it were used by the German army during World War II, as well as Chinese and Japanese forces, so examples are likely to be encountered almost anywhere.

The ZB 26 has a low rate of fire so that, although the weapon is fitted with a selector switch, mere trigger manipulation is sufficient to allow the shooter to fire single shots easily. The barrel is easy to change and has a nice handle on it to both carry the weapon in the field and hold when changing a barrel. Why the U.S. M60 took so long to develop this feature is a mystery to me, since the Czechs had it in the 1920s.

The magazine is top loading, which, of course, is more reliable because of gravity and makes a lower prone position possible despite its high capacity, but it does require offset sights. Although such offset sights seem odd when first encountered and must be troublesome to left-handed shooters or right-handed shooters with left master eyes, for the average person they are surprisingly effective. The magazine release on the test example was somewhat hard to use and made magazine changes slower than otherwise would be the case. Also such top-loaded magazines take more effort to remove, especially when firing in the prone position, because you must reach over the receiver, push the lever back, rock the magazine back, and then pull up and back. However, they are also perhaps easier to load because gravity helps hold the magazine in place as you fit it into the magazine well.

The front sight has good protective wings on it; whereas the rear sight has a deep notch V blade. Although they are easily adjusted, I found the sights difficult to use. Of course, once the burst started, the weapon shook enough that I really was unable to use the sights. I would prefer to paint the front sight white to allow rapid pickup.

The weapon can be fired from the kneeling or hip position (cradled under my arm), but

The ZB 26 LMG is the forerunner of the famous British Bren LMG, and it has many excellent features, including a top-loading magazine and light weight.

its excessive length and weight make firing off-hand extremely difficult. Firing the weapon from the hip position is made more difficult by the lack of a fore-end to hold on to. The barrel gets hot with firing, and when firing it from the hip position, the shooter has to hold either the front of the receiver, which soon gets hot, or the bipod legs. Unfortunately, when folded, the latter are close to the barrel, and because of their shape and the weapon's weight, it was quite easy to have your left hand touch the barrel. If you have fired two magazines through the weapon, your hand then will jerk backward involuntarily and the weapon will drop to the ground because you cannot (or at least I cannot) hold the weapon with one hand at the hip position. Such LMGs are typically shot from the prone position, but they need a handguard to permit them to be shot off-hand without worrying about burning the hand. The ZB 26 lacks this feature; therefore, it is less useful tactically than otherwise would be the case.

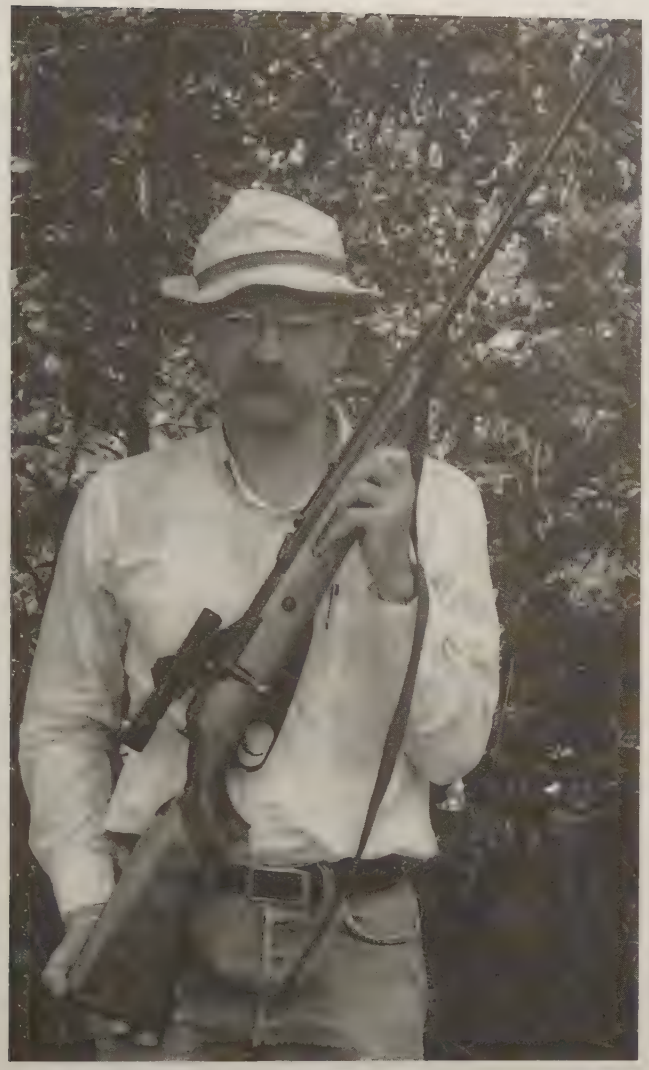
The ZB 26's quick-release barrel system was revolutionary for its time and better than the system found on early M60 LMGs. In this photo, the author flips up the latch to allow the barrel to be removed.

When you consider that men who were not even born when this weapon was made are now retired, you realize how much of a breakthrough this weapon represented. Before it came on the scene, LMGs were water cooled, used belts, and lacked quick-change barrels. After the ZB 26, the LMG had to weigh less than 20 pounds, have quick-change barrels, and use magazines. Even in the last decade of the 20th century, a ZB 26 looks like a good LMG.

CZECH VZ 54

This rifle was manufactured in Czechoslovakia as a modification of the standard Mosin-Nagant M91 rifle. It looks like a "sporterized" M91 rifle because of the handguards being cut back to expose a lot of the barrel and the mounting of the 2 1/2 X scope. As such, you approach the weapon with some anticipation that here will be a good M91 rifle that overcomes the weight and balance problems of a standard M91 rifle and offers a much more sophisticated package than existed with the Soviet sniper versions. Alas, the Czechs did not do anything more to the Mosin-Nagant than the Soviets did. Perhaps nothing much can be done because of the basic design, although the Finns were able to do more with at least the trigger pull.

The rifle has a half stock, but it retains iron sights, unlike most U.S. sniper rifles now being produced. The rear sight is the standard sight, which has a V notch and is hard to see. The front sight is a pyramid type, which is hard to use, but it is well protected. The scope



The Vz 54 is a modification of the standard Mosin-Nagant M91. It should be considered no more than a cheap alternative deer rifle for targets no more than 200 yards away. It is unsuitable for sniping.

has a cluttered reticle with heavy posts coming out from both sides and a pointed post of good thickness coming up from the bottom. If the cross posts were deleted, it would be a good deer-hunting scope at 2 1/2 X, but the scope's clutter and low power make it unsuitable for sniping. Optic quality is also low, which is especially disappointing given its source of origin. It clearly was not as bright as a mid-1980s' commercial hunting scope. The scope's eye relief is critical, and the stock comb is so low that it is difficult to get your eye in the correct position and maintain it.

The scope is mounted in the sturdy scope mount that attaches to the side of the receiver with heavy screws. Although it can be removed, it was not designed to be a quick-detachable unit—even though the slot in the bolt handle was designed to be the screwdriver for this mount. Unlike some scopes, it is mounted low, but that makes it almost impossible to use the safety—never an easy thing to use on the Mosin-Nagant anyway.

Interestingly enough, the front sight can be seen while using the scope, which further clutters up the field with the "ghost image" of the front sight in the scope's field of vision.

The trigger pull is clearly that of a standard M91 Mosin-Nagant, which seems odd when comparing it with the fine trigger pull I have on my M28/30 Finnish Mosin-Nagant rifle.

The sling on the Vz 54 is not designed to be used as a shooter's sling and does not enhance shooting in any way; it is actually only a carrying strap. This means that you will lose about 30 percent of the practical accuracy of the weapon, because a sling used properly will improve field performance by that much.

The action is smooth enough when cycled with an empty rifle, but once a round has been fired, it is so stiff that I cannot work the bolt without removing the rifle from my shoulder. Of course, this is a problem with all Mosin-Nagant rifles, but such an action slows repeat shots, and, for the sniper, the activity accompanying his removing his rifle from his shoulder, working the action, and then remounting it may well disclose his presence.

Added to all of these difficulties, the Vz 54 is long, heavy, and ill balanced, making both off-hand and kneeling shooting difficult. With the more stable sitting and prone positions, this problem is minimized, but the trigger pull coupled with the scope's critical eye relief adversely affect performance. I was getting about 2 1/2-inch groups at 100 yards with

Left side view of the scope on the Vz 54.

factory-fresh heavy Bulgarian ball ammunition. I would consider such results marginally acceptable for a brush country deer rifle, but they are not acceptable for a sniper rifle. A good sniper rifle should be capable of hitting enemy targets at distances beyond where a standard infantry rifle can inflict damage. The Vz 54 is little better in this regard than a standard M91 and, accordingly, must be rated well below other sniper rifles that are better conceived.

The Vz 54's best role is that of a cheap alternative deer rifle for targets no more than 200 yards away. It is out of its league when competing with such things as the Accuracy International or M40A1 rifle.

Denmark

DANISH M89 RIFLE (GEVAER M1889)

The Danish Krag rifle is a relatively rare rifle in the United States. Perhaps as few as 186,000 were ever made, and they are chambered for a rimmed cartridge not used in any other nations' weapons. Rechambering them is an awkward problem because of the generally acknowledged strength of Krag actions, and all these factors, plus the ravages of World War II, have conspired to make them rare guns here.

Like the M88 German commission rifle and M89 Belgian service rifle, the Danish M89 has a barrel jacket over a relatively thin barrel rather than using an upper forearm to prevent injury resulting from heat buildup. Once again, rust is a problem, and heat from the sun no doubt makes the weapons too hot to touch more frequently than does shooting them.

The rifle lacks a cleaning rod under the barrel and a butt trap. The absence of either of these features is a serious deficiency in a military rifle, but the absence of both is unforgivable. If the cleaning equipment is with the rifle, the shooter is likely to use it to keep his weapon clean. If the supplies and equipment are back with the baggage train, weapons will be ignored and reliability will ultimately suffer.

The sights consist of an unprotected pyramid front and a V-notch rear, also unprotected, graduated from 400 to 2,000

Shooting the 8mm Danish Gevaer M1889 rifle. Note that the rear sight is up to permit proper sighting at a 200-yard off-hand target. With the sight lowered (in battle position), the rifle is set for 400-meter shooting, which usually results in overshots.

meters in the up position with a battle sight fixed for 400 meters. Overshooting at typical combat ranges is the logical consequence of such sights on every other weapon, and I have no reason to believe the same would not apply with the M89. Rifles should have practical sights and settings if they are to be useful for the weapon's intended purpose. The sights themselves are hard to use because of their shape, narrow notch, and the projections found near the rear sight, which clutter it up and which I found visually disturbing when I was attempting to mount the weapon and shoot at fleeting targets.

The M1889 rifle itself is both long and heavy. It is especially muzzle heavy, which makes off-hand and kneeling positions very difficult to use effectively. Such extremely muzzle-heavy rifles can be used prone, especially prone supported, quite effectively. The muzzle-heavy position also dampens recoil and muzzle flip. But a combat rifle is designed to be shot frequently from off-hand or kneeling. In fact, those positions realistically cover 60 percent of combat firing. For that type of practical shooting, you want a weapon to balance between your hands, not to be muzzle heavy.

The Danish Krag like all the other Krag variations, is slow to reload. No realistic solution ever was achieved for this problem, and they remained single loaders rather than clip loaders throughout the period in which they were in use. The Danish Krag did have one superior feature to all the other Krags: an effective safety. Whereas the other Krags all used a winged-type safety setup on the rear of the bolt, a safety which may not be fast to remove but which is certain, the Danish Krag has a little side button on the right side. The shooter can take up his grip and flip the safety off, using light thumb pressure only. Yet the safety is sheltered from being brushed off accidentally or snagging on pieces of cloth and equipment. It is, I believe, the best Krag safety design.

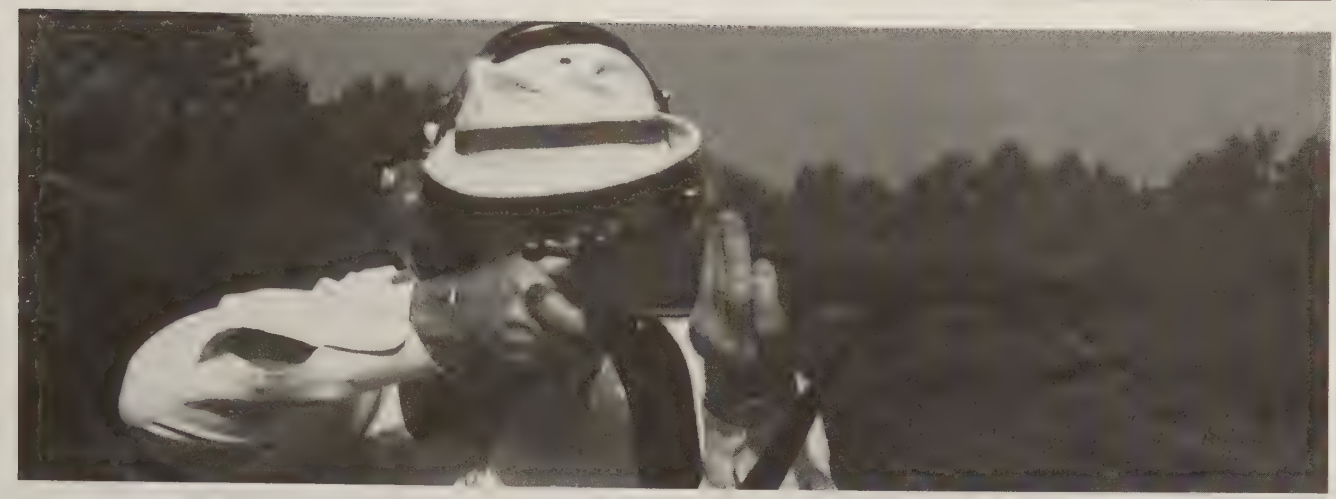
Although the Danish Krag M1889 did not have a glorious history in World War I, when

Shooter's-eye view of the rear of the Danish Krag action. The large knob of the firing pin makes the rifle look much like Winchester or Marlin rifles and provides a good grip for pulling it to the rear in case of a misfire. Such ammunition failures were more common in the early part of the 20th century than they are today, but it has always seemed more logical to me to merely remove the defective round from the rifle and try the next round in combat than to waste time and effort with what is obviously a defective round.

Denmark was neutral, or during World War II, when the country was quickly overrun by German forces, it is I believe the best Krag action, primarily because of the above-mentioned safety feature. If you want to build a fine sporter for hunting and can use a rimmed cartridge with peak pressure of 45 to 48,000 pounds per square inch (psi), the Danish Krag would be worth seeking out. As with all Krags, the M1889 makes an excellent hunting rifle but poor military weapon.

DANISH M 1889 ENGINEER CARBINE (INGENIØR KARBIN M1889)

For reasons that are not totally clear to me, apparently a lot of people believe that engineer troops should carry shorter rifles than infantry troops. I think perhaps they have it backward: the problems faced by an infantryman demand short, light, convenient



The Ingeniør 8mm Krag carbine is much "livelier" in the shooter's hand than is the infantry model.

weapons as much, if not more than, those faced by a battlefield engineer. I must, however, be alone in this theory; European armies of the pre-1914 era commonly issued their engineers a rifle longer than the carbine issued to horseback or bicycle troops yet shorter than infantry rifles.

This rifle has the typical V-shaped rear sight graduated from 200 to 2,000 meters, so at least some practical sighting distances are provided. It does not have wings to protect it from jarring or other damage. The front sight is pyramid type modified by having a flat top on it. The flat top allows a much better sight picture to be achieved than the thin, sharp top of typical pyramid sights. The V notch is still too narrow, however, making it very slow to get a sight picture, and it is difficult to use in poor light.

As with the standard rifle, a magazine cutoff is supplied, and the Krag loading system precludes clip loading. The safety is on the right side and is clearly the best safety ever fitted to any Krag rifle regardless of its nationality. It is quick to remove, and unlikely to be snagged or accidentally turned or disengaged.

No butt trap or cleaning rod is provided, which is unfortunate. I suppose the Danes never learned how useful such devices are in the field because of the relatively minimal exposure this weapon has had to wartime conditions.

The rear sling swivel is on the side of the rifle to allow the rifle to lie flat when carried across the soldier's back. Care must be taken to avoid this swivel's striking the thumb when using the rifle because the recoil will jam the metal swivel into the thumb, causing some pain.

The trigger pull is the typical two-stage pull, and it is quite heavy. Such trigger pulls, while helpful in avoiding accidental shootings, are particularly troublesome in the off-hand or kneeling position, although even the best work cannot be done from prone with such excessively heavy pulls. A good trigger pull is the key to good shooting with either a rifle or pistol.

An interesting visual effect is caused by the large hammer-like projection that appears on the rear of the bolt of the Danish Krag. Viewed from the rear, this rifle looks like an M92 Winchester. I found that appearance rather odd when holding and operating a bolt-action rifle, although it obviously has no effect on the rifle's performance.

Although fairly heavy for its length, the rifle felt fairly "lively" in my hands, and it was only slightly muzzle heavy when used in the off-hand position. This "liveliness" characteristic is really hard to define: some rifles have it, while others that are of similar weights and lengths do not. I suppose it is the distribution of the weight that is critical. In

any event, the Ingeniør Karbin M1898 has it, and the infantry model does not.

I have always liked Krags and found these Danish Krags to be the best of the lot. If I had the legitimate need for it, I would rebarrel one in 30/40 Krag (or even better necked up to .35) and use it for a woods rifle. I am certain I would be as well satisfied with it as with any Mauser-actioned rifle ever made.

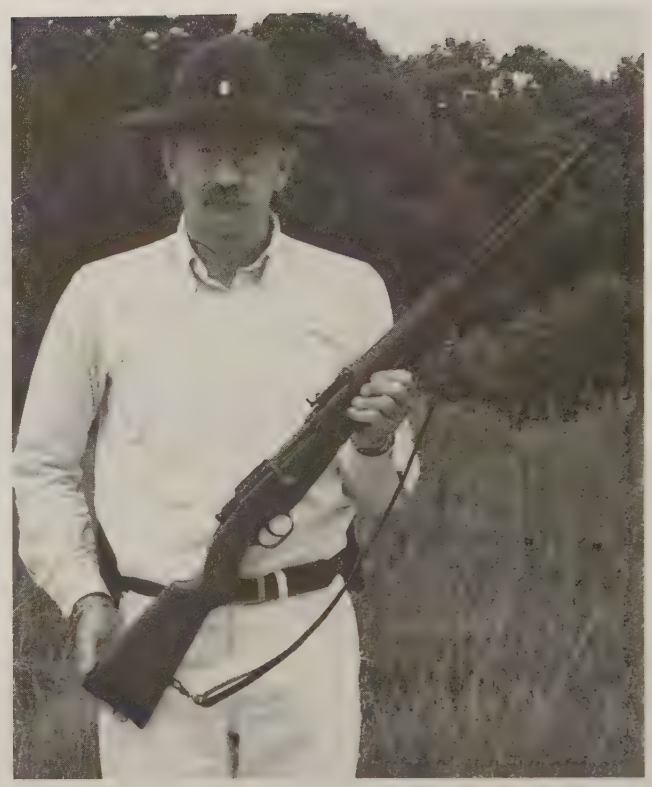
MADSEN M47—.30-06

I believe this rifle may well have been the last bolt-action design put in series production for general military adoption. It was made originally by the Madsen Company in Denmark and was aimed at the low end of the military firearms market. Timing is everything in life, and the Madsesn's timing was way off. The immediate postwar world of 1947 was awash in military rifles: the United States and Soviet Union were giving away modern rifles to poor countries that asked for them, the British were selling their surplus rifles off at a great discount, and arms merchants who had large stocks of fine French, German, Italian, or Japanese rifles were selling to countries that were poor but did not want to accept Soviet or U.S. aid with the strings it brought.

As a consequence, sales of the Madsen M47 were very small. Only Colombia purchased them, and from the condition of most I have seen I would guess the Madsen rifles were used very little there—the Colombian army preferred Mausers or M1 Garands. That is a shame because the Madsen M47 has some very nice points.

The rifle is chambered for .30-06 and is fairly light. Despite this, it recoils lightly because of the muzzle break on the barrel and the thick rubber pad that was installed on all weapons. This low-recoil impulse allows a person to shoot long strings in comfort without wearing bulky clothing on his torso.

Accuracy was as good as one can reasonably expect with an iron-sight military rifle: a 2-inch, three-shot group at 100 yards. The sights are unusual for a military rifle. The front is a blade post, far superior to the usual pyramid front sight commonly seen. The rear sight features a peep that, unfortunately, is located in the same position a standard ramp sight would be, which lowers your ability to use it. The peep sight is good, but it needs to be located more to the rear. The front sight could stay in the same location and configuration, but the peep should be removed to the rear of the weapon. It would be much easier and faster to use this way.



The Madsen M47 is pleasant to shoot because of its light recoil and decent balance, but it is not as good as many comparable rifles.

Another good point about the sights is that they were calibrated in a practical fashion. Unlike on many military rifles where the lowest setting is 300 meters, on the Madsen M47 it is possible to set the sights at a more practical 100 meters. With such sights, the shooter can sight in his rifle properly and not have to calculate where he will likely hit when encountering an assailant at typical confrontation distances.

Colombia was the only country that purchased the Madsen M47 for its military. This left-side view shows the peep sight, which is too far forward for best use.

The safety is fast and certain. To apply it, you must push on the lever and flip it up. To remove it, you merely need to push it aside. It will flip off with certainty and ease.

The stock has a good high comb on it, which allows me to place my cheek on it and not have to lift my head to see the sights. Additionally, such high combs lessen the recoil impulse due that results from barrel whip, allowing for faster repeat shots.

The Madsen M47 uses a Mannlicher-type action with bolt handle. It is farther out on the rifle than I prefer, and the bottom of the bolt handle is flattened, which interferes with the ability of the shooter to manipulate the bolt quickly. The action on the rifle tested was stiff, but that may have been attributable to the fact that it was like new. Perhaps with a few weeks' use it would slicken up.

The trigger pull was standard for a military bolt-action rifle—not up to match standards by any means—but a 2-inch, 100 yard group with GI ammo shows that it did not prevent good shooting.

The magazine is integral with the action, and unlike the typical Mannlicher-style action (which uses a stripper clip to insert and hold the cartridge), the M47 uses a Mauser-like box magazine with a bolt-hold-open device, which tells the shooter when it is time to reload.

The Madsen M47 is pleasant to shoot because of its light recoil and its decent balance. The rear sight is difficult to use because it is too far from the eye for best results; even so, it is much better than the shallow V or U shape seen on many European bolt-action military rifles.

The Madsen M47 is not as good as many rifles, but it is probably better than it should have been because of changing military needs. Having said that, I would note that I tested an M91 Italian Carcano 6.5 carbine the same day and if forced to choose between them, I would pick the latter every time. Enough said!

Egypt

RASHEED—7.62X39MM

After World War II, the Egyptian military originally had the Belgian 8mm semiautomatic ABL supplied by FN. Later, it purchased a rifle designed in Sweden, adapted it to 8x57mm, and called it the Hakim. After King Farouk was deposed in 1952 and Col. Nasser, who was elected president in 1956, took Egypt from the Western camp to the neutral to the pro-Soviet camp, the Egyptian military adopted the 7.62x39mm cartridge. Although the Soviets supplied a lot of weapons, the Egyptians wanted to produce their own weapons, so they set up factory to make the AK-47 and modify the Hakim. The revised Hakim became the Rasheed, which was merely a shorter weapon chambered for the short 7.62x39mm cartridge. You may think of it as Egypt's answer to the SKS.

If you compare the Rasheed to the AK-47, the AK-47 is obviously superior with its detachable 30-round magazine and excellent gas system. On the other hand, if you compare the Rasheed to the SKS, the Egyptian rifle fares much better. Like the SKS, the Rasheed is designed to use 10-shot stripper clips to load it. Unlike the SKS, which uses a detachable magazine, the Rasheed has an integral magazine that is not designed to be detachable or to be used for carrying spare ammunition because it is difficult to get out fast. The Egyptian troops were not issued spare magazines as they

Given a choice between the Egyptian Rasheed and the SKS, you would do better to pick the SKS. It is a much better thought-out and executed battle rifle design.

were with the AK-47, but the Rasheed would allow troops to unload the weapon rapidly without spilling loose rounds on the ground, as frequently happens with the SKS, and they could take the magazine out, load it, and then reinsert it so that they had a fully loaded weapon without emptying the chamber, as is required with the SKS.

Both the Rasheed and SKS come with a fixed stock, and the Rasheed has a folding blade unit. Because I have a tendency to grab the rifle up at the point on the forearm where the blade is exposed, if the blade is sharpened properly, I have to really watch my hand to prevent it from being sliced open. It seems to balance at or near that point. Of course, most bayonets are never really sharpened like a knife, but it does seem a poor location. Frankly, most SKS rifles I have seen in the field had the bayonets removed because they tended to rattle and merely increased the weapons' weight without any real benefit; however, most I have seen in the field were Chinese spike-bayonet weapons. It would not surprise me to see that the Rasheeds found in the field would have had their bayonets removed as well.

Unlike the Swedish AG42B, the Rasheed has a cocking handle to load the weapon. The magazine is detachable, but the Rasheed is designed to use the stripper clip.

The Rasheed's sights are very similar to those found on the SKS. The front sight is dark and protected by a substantial sight hood that, while protective, tends to make it very difficult to pick up the front sight with any speed as it gets darker. At least it is a post rather than one of those terrible pyramid types. The rear sight is a shallow V—vamp unit—and really needs to be widened and deepened if quick work is to be done.

The trigger pull on the Rasheed is typical of that found on semiautomatics; that is, it is both heavy and squishy.

The safety is located on the rear of the receiver cover. It is slow to remove and install. There is nothing instinctive about removing it, and it requires you to take your fingers and carefully flip it over. Anything that requires such fine motor skills is always slow. The rifle originally came equipped with a sling. The swivels in the rifle are fixed, and the sling has metal on the end as well as metal snaps. As a consequence, metal is touching metal, which sends off a loud, distinctive sound. Therefore, the sling needs to be removed or taped up for patrolling.

The weapon is firmly installed in the stock with a screw holding the forearm on. You cannot remove the action from the stock easily, as you can with the SKS, to give the rifle a complete, careful cleaning after you fall into a mud hole or water. As a consequence, all the metal hidden by the stock will ultimately rust. It may not make any real difference, but it does seem unfortunate.

The barrel on the Rasheed is thin, and firing 40 to 50 rounds rapidly through the weapon will get it very hot. Likewise, the handguard will get very hot, ultimately making it difficult to grab the forearm. In a hot, desert environment, it must be a worse problem than it was in Missouri on a 90-degree day.

The Rasheed is slightly heavier than the SKS

and balances well. Recoil, both actual and felt, is quite low, allowing the shooter to get back on target quickly for a second shot—or at least the shooter would be able to get back on target quickly if it were not for the sights being so hard to see, which is a drawback also with the SKS.

The Rasheed lacks the cleaning rod and cleaning supplies found on the SKS, which I view as a serious drawback. If at all possible, both cleaning rod and supplies should be attached to the rifle; that way, if you have the rifle, you have the equipment and supplies necessary to clean it. You do not need to cut up shirts; get straight, thin, tree limbs; or ignore the problem, which ultimately results in malfunctions at the worst possible time.

Given a choice between the Rasheed and the SKS, you would do better to pick the SKS. It is a much better thought-out and executed battle rifle design.

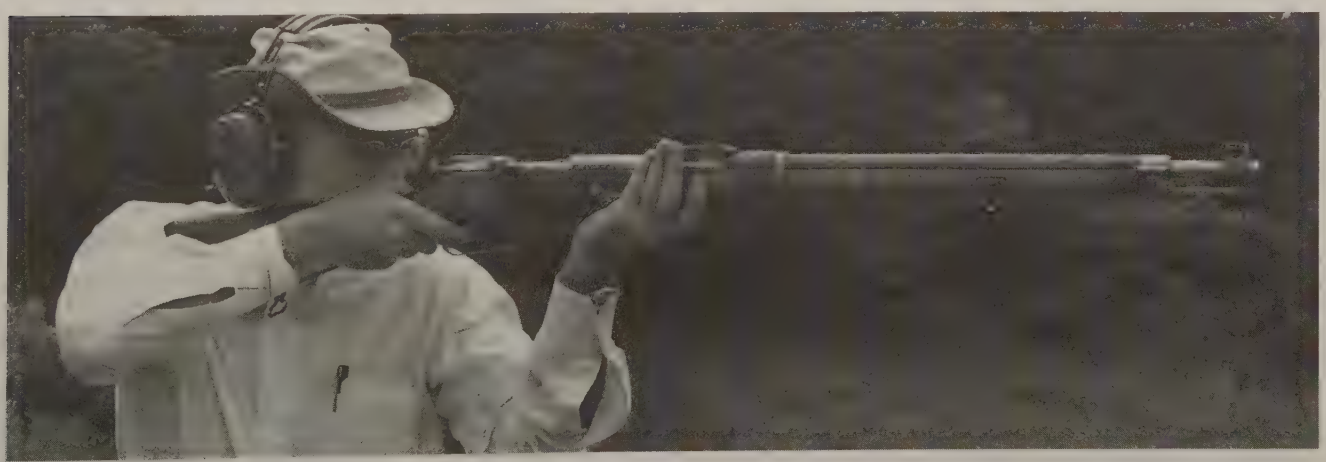
Finland

M1927 FINNISH MOSIN-NAGANT

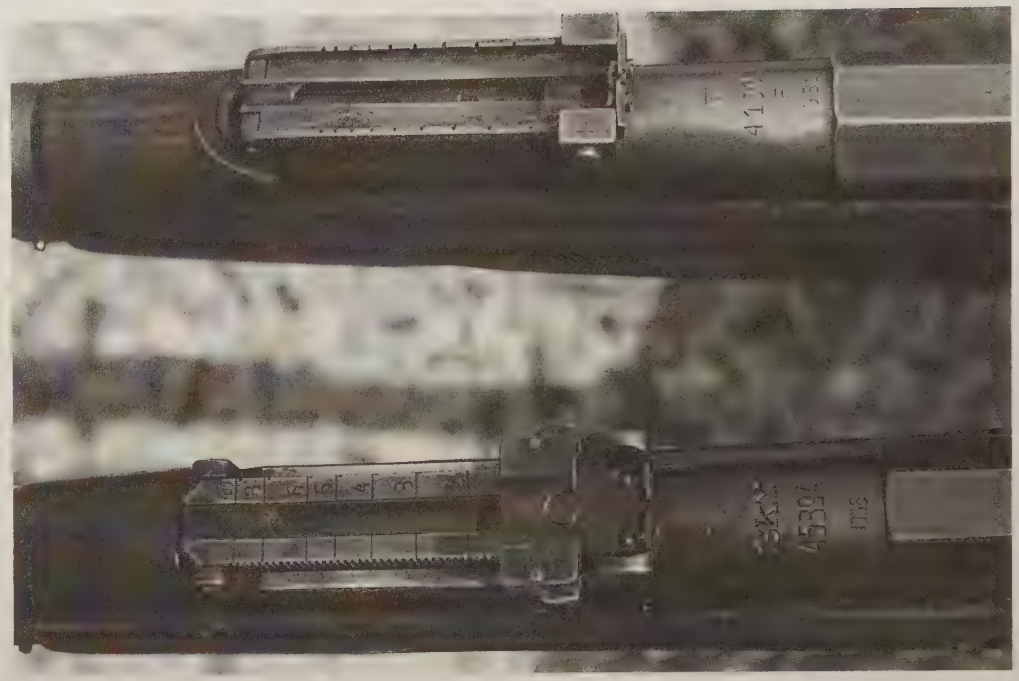
Finland had either captured or been left substantial numbers of Mosin-Nagant rifles when it became an independent country in 1918, having taken the opportunity presented by the Russian Revolution of 1917 to break off from what was to become the Soviet Union. However, as any real rifleman knows, the Mosin-Nagant lacks many refinements to make it a real rifleman's rifle. However, it made sense for Finland to retain the rifles and caliber because the country's attackers were not likely to be Swedes or Germans or Poles walking across the Baltic, but rather the Soviets.

The Finns began a development program to refine the M91 into a better rifleman's weapon. One of the first steps in the process was the M27, which was a distinct improvement over the standard M91—although not as good as the M28/30 that came later (and is no doubt the best Mosin-Nagant ever made, from a shooter's standpoint). Apparently, the M27 was primarily a modification of existing rifles or at least a rebarreling and restocking, although some new production was undertaken also.

Starting at the front, a new, well-protected front sight was installed. It also had a blade front sight rather than the more difficult to use pyramid-style front sight. The barrel was shortened to an easier-to-use length, but was still not as short as the Soviet



The M27 was the first product in the Finnish military's program to refine the M91 into a better rifleman's weapon, and, as such, it was a substantial improvement over the standard M91.



Top view of the sights of the M1928/30 (bottom) and M1927 (top).

M38/44 carbines, in which muzzle blast became critical. The rear sight obtained a windage adjustment mechanism in the leaf. Even though it was not as rugged or as easy to use as the windage adjustment on the M28/30 sight, and to access it you had to loosen a pair of screws, remove the leaf, and then retighten the screws, it was a distinct improvement on the standard M91 sights. It also allowed for a closer zero, thus avoiding the problem of shooting over the enemy at close range. The M27 rear sight also lacked the sturdy wings to protect it from damage that was found on the M28/30, but it still was clearly better than the M91 Mosin-Nagant sights.

Other than the front and rear sights and shorter barrel, the M27 appears to be a fairly standard M91-type rifle. The trigger pull has only a single stage to it and is quite crisp. Most Russian rifles lack this refined trigger, whereas the other Finnish rifles all have similarly pleasing triggers. Therefore, I have concluded it must be the result of something done at the Finnish plant, not by U.S. gunsmiths trying to improve the rifle later. The trigger pulls of the first couple of Finnish rifles were so good that I felt certain that they must have been modified by a gunsmith at some later point, but further evaluation of a number of Finnish rifles have shown all triggers to be good.

The Finnish M27 uses sling swivels that go through the standard slots, and although they probably are better for a shooting sling because they do not cause the sling to twist but rather to lie flatter, they do rattle and need to be taped down.

As with all the other Mosin-Nagants, the trigger guard is surprisingly small: I have always imagined that a big, wide trigger guard for mittens would have been preferred in Finland and the Soviet Union. On a similar note, though the buttplate is sturdy metal, it lacks any opening to contain cleaning equipment to supplement the rod carried under the barrel. I think a butt trap to contain cleaning equipment is always useful and imagine that it would be especially so in a rifle that is commonly used in wet areas and that shoots corrosive ammunition. Its absence strikes me as a real failing.

Although the M27 was clearly not the ultimate Mosin-Nagant (that honor belonging to the M28/30), it was a substantial improvement over the standard M91. As such, it represents an interesting stage in the development of the Mosin-Nagant as a rifleman's rifle rather than merely serving as a long, sturdy, bayonet pole and sometimes noisemaker for peasant soldiers.

The Finnish M1928/30 is quite possibly the best version of the Mosin-Nagant, but the action still tends to stick. Unless this problem can be overcome, serious riflemen will probably not want to choose this rifle. Note the case being extracted in this photo.

FINNISH M1928/30 MOSIN-NAGANT—7.62X54MM

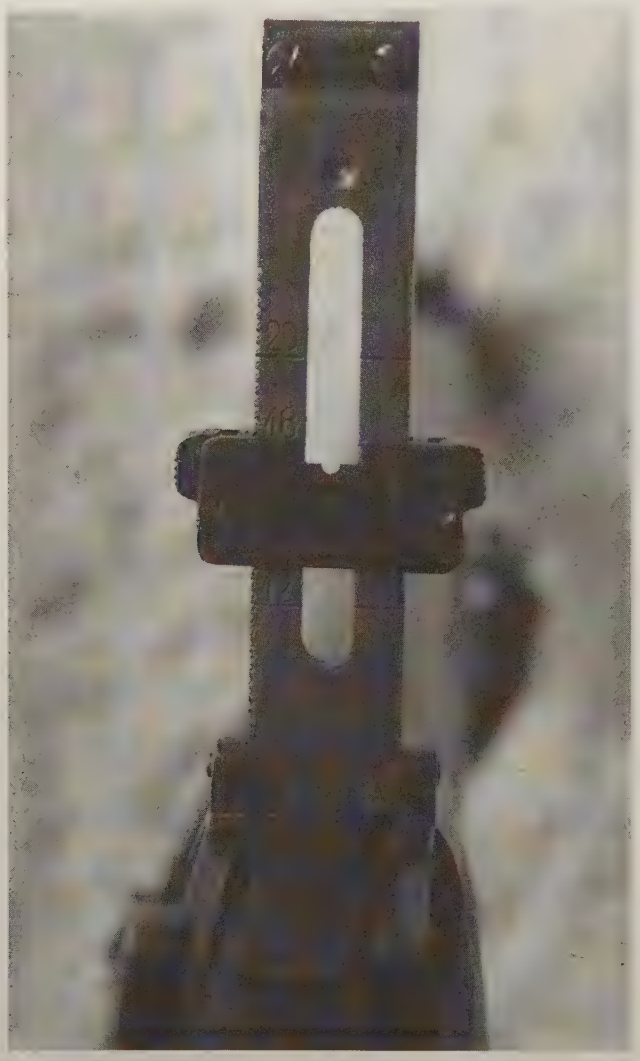
By general agreement, this is the best Mosin-Nagant rifle made in Finland, and since Finland is generally considered to have made the best Mosin-Nagant rifles, it is considered the best Mosin-Nagant–based rifle design in the world. Is it?

The M1928/30 is shorter than the standard M91 rifle and has a thicker barrel, which was supposed to help stabilize the weapon and provide better performance. Supposedly, the maximum size groups acceptable from such rifles is 1.3 inches at 100 meters. My group size was 1.75 inches at 100 yards; I assume that the desired results could be achieved if the rifle were being fired with better ammunition, from a better rest, and in more competent hands than mine.

Apart from the fact that it is shorter than the M91, the next best things about the M1928/30 are its front and rear sights. The front sight is well protected by sturdy wings and has a blade-type front sight rather than the typical pyramid style. The rear is also well protected but, unfortunately, consists of a fairly shallow U notch that does appear wider than that found on earlier rifles. It is graduated from 200 to 1,000 meters, so practical shooting is possible, which is an improvement over the situation with the M91. It also can be adjusted for interim ranges, which is always important because what is a "perfect zero" for my eyes at 200 meters might be at 225 meters for another person's eyes. Equally valuable is the capability for adjusting the sight for windage. Thus, it is possible to rear-adjust the sights to the individual shooter's POI. Being "a little off" simply will not do for serious riflemen, and the M1928/30 was designed to be used by serious riflemen.

The stock uses slots in the wood for sling mounting, which is a nice feature because it avoids the rattle problems commonly encountered in other rifles. It has no butt trap, but it does have a cleaning rod slung under the barrel.

The action was quite slick for a Mosin-Nagant rifle. Whether this was part of the manufacturing process or just something peculiar to the test rifle, I do not know. I have not had the opportunity to test a wide variety of M1928/30 rifles. However, even though the action was slicker than any other Mosin-Nagant rifle I tested, it still was not in the



Two of the M1928's best features are its front and rear sights. Nevertheless, the rear sight has a shallow U notch that is difficult to use.

league of even an M91 Carcano, much less a Swiss M11/K31 or Krag rifle. I had hopes when I saw how slick it was without cartridges that it would be a fast rifle to operate, but I was disappointed once the first round was fired. Because of the nature of the action and construction of the bolt, I simply could not hit the bolt handle with the palm of my hand and raise the bolt. Instead, I had to grab it with my fingers, then turn the rifle slightly to the left to improve my leverage on the weapon, and pull up hard on the handle. Only with a real tug could I chamber a new round smoothly. After running the bolt home to get the bolt handle down, I had to pull hard on the handle or, better and faster, hit it with the palm of my hand. This situation did not result from using oversized or defective ammunition or because of overpressure; rather, it resulted from a design problem. I almost had to take the rifle from my shoulder to pull the bolt up, and any time you do that, you really slow down the process. I do not know whether it is possible to overcome this problem, but as long as it exists, the Mosin-Nagant rifle must be placed low on the list of good combat rifles.

Although the sights had better adjustments than the earlier versions, they still were hard to use. While the flat blade is easier to use than a pyramid, the U-shaped rear is still too narrow and shallow. Keeping the windage and elevation centered is very difficult, although better than on the M91 sights. The Finns should have used a square notch and allowed enough width to give light on both sides and enough depth to permit the sight to be used in dim light. Had they then painted the front sight (not white I suppose, given the climate, but something easier to see than black), the shooter would be able to pick up the sights faster and maintain a proper sight picture easier.

The M1918/30's barrel is very heavy in contrast to a standard M91 barrel. Although the rifle is muzzle heavy, the weapon has enough weight along its length that the rifle seems to hang there in a very steady fashion in both the off-hand and kneeling positions. I was surprised at this; I would have thought that the heavy barrel would have made it too muzzle heavy to be convenient, but instead it gave it enough weight to be steady and distributed it in such a fashion that it "hung" nicely between my hands with the sights centered on the target.

I rather liked the M1928/30. Whether this was because I knew it had been made by serious riflemen who proved its worth in the 1939–40 Winter War when they held off the massive Soviet armies or whether it was

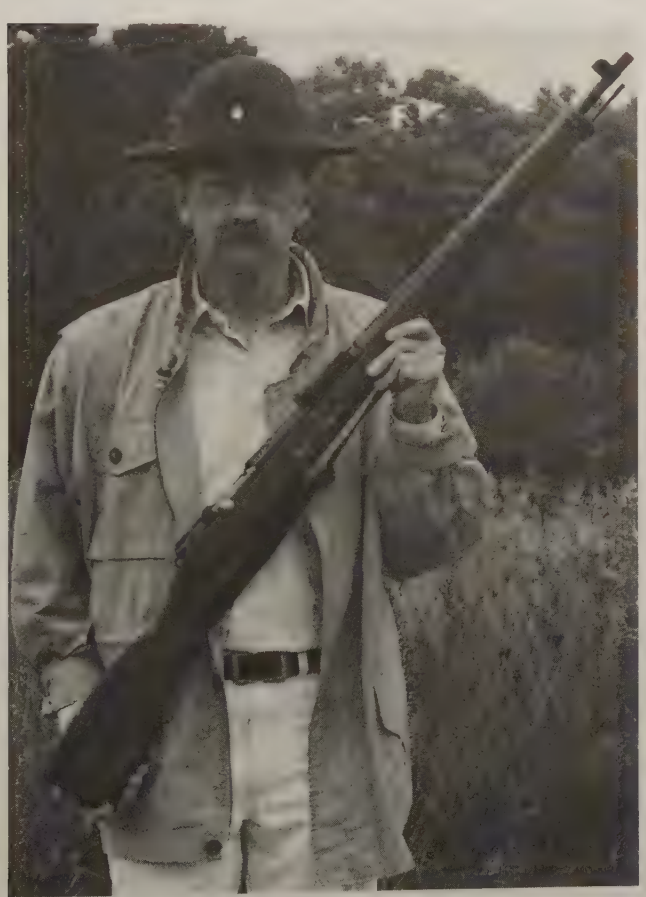
because it truly is the best designed Mosin-Nagant, I cannot say. If 7.62x54R ammunition ever gets cheap, which I understand may happen, I may get an M1928/30, alter the sights to either square notch or peep, and use it for my bolt gun in that caliber. Until that occurs, I will stay with smoother actions that can be fired more rapidly.

M39 MOSIN-NAGANT

The M1939 was the last Mosin-Nagant model developed in Finland and offers the same style sights as the M1928/30 rifle and a semi-pistol grip as well. The front sight is the same as on the M1928/30, and the rear is similar but not identical. The sight is graduated for 150 to 1,000 meters and has a narrow, shallow U notch. The notch seems narrower than that found on the M1928/30 and, as a consequence, the M39 is slower to use in dim light. The sights were difficult to see and use because of the narrow U-shaped notch.

The test example was made in 1942 by Sako and was in mint condition. I doubt it had ever been issued. Unlike the M1928/30 tested, the action was stiff and the trigger pull heavy. Although shorter than the standard M91, the weapon was quite muzzle heavy, and that coupled with heavy trigger and poor sights result in poor off-hand and kneeling shooting.

Some people like pistol grips on rifles; whereas others prefer the straight or "English" style. Most Americans are used to pistol grips



The author picks the M39 as a close second to the M1928/30 for his favorite Mosin-Nagant model. The earlier M1928/30 model had slightly wider U notch that made it faster to use in dim light.

The front sight on the M39 Finnish Mosin-Nagant is well protected and has a good blade-like shape, which makes it easier to use than the typical pyramid-shape front sights.

on bolt-action rifles, and the M39 felt quite normal to me. Many people think straight grips are faster on jump shooting than pistol grips, but I have never noticed the difference. When using one hand only, I do believe I can control a rifle better when it has a pistol grip than I can with a straight stock.

All the Mosin-Nagant rifles suffer from a few standard problems: the sights are hard to see, the triggers are heavy, the safety is slow to use, and the actions are stiff. The M39 is shorter than the M91 or M91/30 rifles and does offer a better front sight, but otherwise it is really no better than any of the models that preceded it as far as these deficiencies are concerned. Although it made sense for the Finnish military to adopt the same caliber as used by its nearest enemy, it was not until it adopted its version of the AK-47 (the M60/62) that it truly improved the rifle. With the M60/62 the Finns took the very fine Soviet design and gave it to the best sights seen on an AK-type rifle up to that point. By doing so, they made it the most practically accurate AK-47 variant available. Had they done that with the M1928/30 or M39, no doubt the result would have been the same: an enemy's design made better when used by troops capable of utilizing the improvements. It is unfortunate that the Finns failed to take the opportunity to do this when they had the chance.

France

M1886 R93 8MM LEBEL

This was the first military rifle designed for smokeless powder, and it represented a major breakthrough in firearms technology. Today, we do not appreciate this breakthrough because most of us have grown up with smokeless ammunition, but firing a few rounds of black powder will quickly point out how revolutionary this breakthrough actually was. At the time, it was considered a military secret, and French soldiers were forbidden to open up cartridges to expose the powder, under severe threat of punishment. Remember also when the M1886 came out, the U.S. Army was using a Trapdoor black-powder single-shot rifle. It is clear that France was way ahead of the United States.

However, France did not continue to pioneer in rifle development, and the M1886 R93 8mm Lebel was standard issue in World War I and was also seen in the field during the early stages of World War II, especially in the hands of colonial troops.

The rifle contains a tube under the barrel that holds eight cartridges. In this regard, it is much like a Winchester lever-action rifle. The 8mm Lebel cartridge is pointed, however, which gives it a better ballistic coefficient than the rounded cartridges found in Winchester or Marlin lever-action guns. The Lebel is able to accomplish this and avoid detonations by using a groove around the primer, and the head of bullet fits into this

French troops of the pre-1914 era with their M1886 R93 rifles.

French colonial soldier armed with the M1886 rifle during World War I.

groove rather than resting on a primer. (Cartridges can fire when in tube magazines with a bullet resting on a primer; my friend Kent Lomont severely injured his left hand that way when using his M1886 Winchester rifle and very sensitive primers.)

The bolt action was very stiff and awkward, resulting in slow reloading. The bolt handle was not really designed for speed loading because of its shape. Instead of being able to pull it open and move it close with the palm of your hand, as you can do on any typical bolt-action rifle, you must grab the bolt handle with the fingers to use it properly. This is slow in warm weather and would be even worse in the cold when the shooter is wearing mittens.

The weapon's sights are calibrated from 400 to 2,400 meters, hence the weapon was shooting quite a bit high at 100 yards. The sights were very hard to see, consisting as they do of a very small front sight and a tiny U-shaped rear slot. Keeping the proper elevation is difficult.

The weapon lacks an upper forearm, and it gets hot quickly. On the day I tested this rifle, it was 90 degrees, and just a few rounds caused the barrel to get so hot that it became hard to handle. Certainly, this rifle was used in places where it got a lot hotter than 90 degrees.

I found the tube magazine odd: you could feel and hear the rounds shift in the magazine as you shot the weapon. Not only is this rather distracting, but also the noise would be dangerous when troops are on patrol. The tube magazine does hold eight rounds, which was a nice feature in the days when typical military rifles were either single shots or held five rounds. There is a magazine cutoff to permit you to fire the rifle as a single shot and

Right side view of M1886 R93 rifle cutoff, which is positioned to permit the firearm to be used as a single loader with ammunition held in reserve. The cutoff is the button at the bottom of the receiver. When it is flipped to the left, the follower in the action drops to allow tube magazine loading.

then hit the release to turn it into a repeater when an emergency arises or as the opportunity presents itself.

The trigger is very straight, which caused my finger to go to the top of the trigger. This in turn caused me to hit the bottom of the receiver, which tended to make my shots wander somewhat.

The bolt is a two-piece affair, requiring you to loosen a screw to disassemble the bolt and then remove it from the action for cleaning. I think any disassembly that requires you to remove a screw, which will no doubt get dropped into the mud in short order, is unacceptable. I imagine that many of these rifles got sidelined during the war as a result of this stripping feature.

The biggest point to watch on this rifle is to the rear. You can short-stroke the rifle; that is, pull the bolt back far enough to eject an empty forcefully yet not far enough to allow the follower to pull up a new cartridge, thus emptying the fired case but failing to chamber a new cartridge. At that point, instead of a blast you get a click, and you must pull the rifle all the way to the rear and properly reload again. This is a serious defect, but I suppose with practice you would learn that you must pull until you feel a solid thud, which represents the bolt going all the way to eject an empty and then permitting the bolt to pick up a fresh cartridge as it is closed.

This rifle is obviously obsolete; frankly, it was obsolete by the start of World War I. Even so, it turned out to be a rugged rifle in the trenches, even if not that fast in actual shooting. Despite the long barrel, it balances nicely and has both a moderate report and recoil. The sights are a serious disadvantage, as they commonly are in military rifles of this period.

When reviewing this rifle, keep in mind

World War I French soldiers with M1886 8mm Lebel and British soldier with No. 1 MK III (second from front).

that it was the first smokeless military rifle and compare it to what other nations used at the time. By doing that, you will see why the French were so proud of the M1886 R93 rifle.

M1886 R35

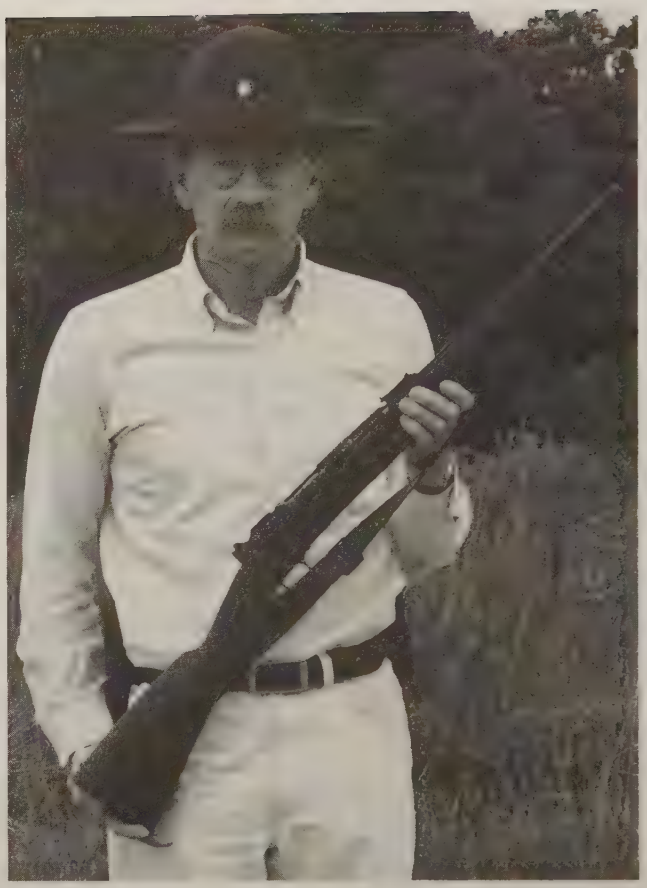
This is basically a carbine version of the R93 just discussed. It was produced in 1939, so it is clear that the French were willing to spend the time and money to develop these rifles even when they were producing more modern rifles such as the MAS 36. I imagine that most of these rifles were never used and that any issued went to colonial troops only. The R35 is a three-shot model with the magazine tube located under the barrel.

The sights are adjustable for 200 to 2,000 meters, which is less than the R93 and also reflects a more commonsense approach to where a carbine such as this one is likely to be used.

The barrel is slightly shorter than 18 inches, and it makes for a very neat package. Muzzle blast is much higher than the R93, as is recoil because of the R35's lighter weight. Because it is shorter and firing with the same ammunition used for the R93 test, there was quite a bit of muzzle flash evident even in broad daylight. At night, I am certain it would be dazzling. I encountered no such blast or flash when I tested the R93 rifle.

The rear sight is quite good because it is square and fairly large. Unfortunately, it is mated with a front sight that is 3/16 inch. This extralarge sight has a center cut down it, which permits the sight to be centered as long as a six-o'clock hold is used. No doubt this sight would be good at night or when the need to quickly engage military targets presented itself.

The ammunition I used to test this rifle was typical of many French surplus ammo lots: it had a lot of misfires, duds, and hangfires in it. As a result of this poor ammo, a trigger pull that was not very good, and the large sights, I got a 6-inch group at 100 yards. That is not very good, but the ammo was probably 50 percent of the problem.

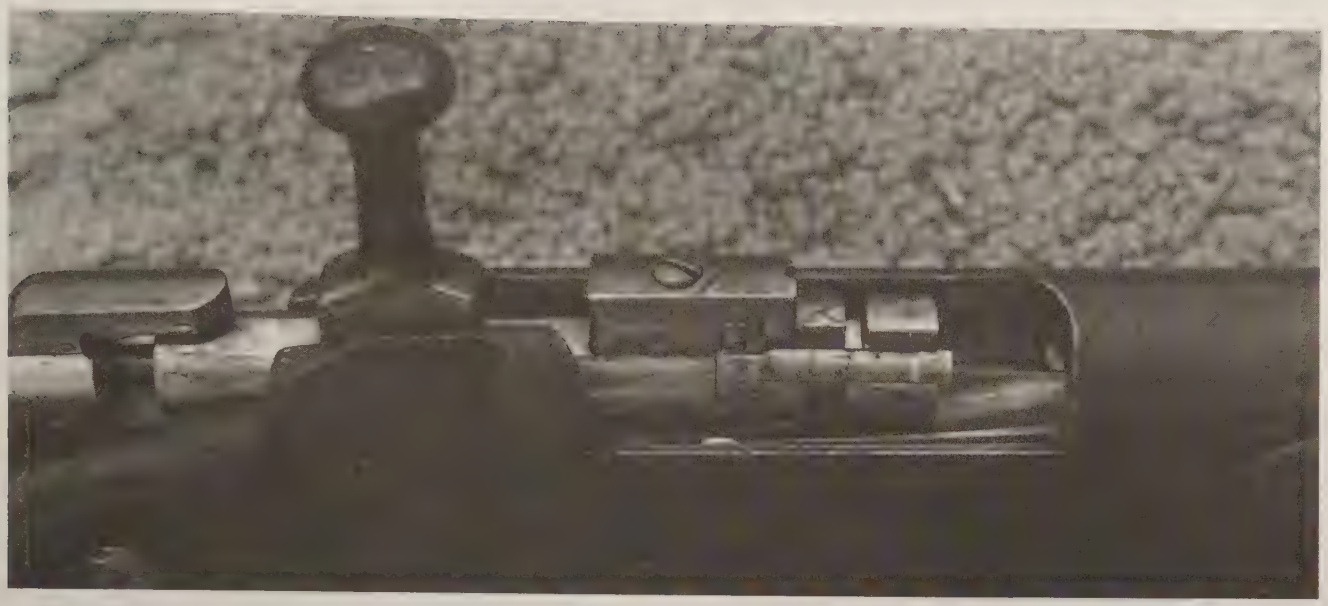


The M1886 R35, essentially a carbine version of the R93, is a very handy, very French rifle.

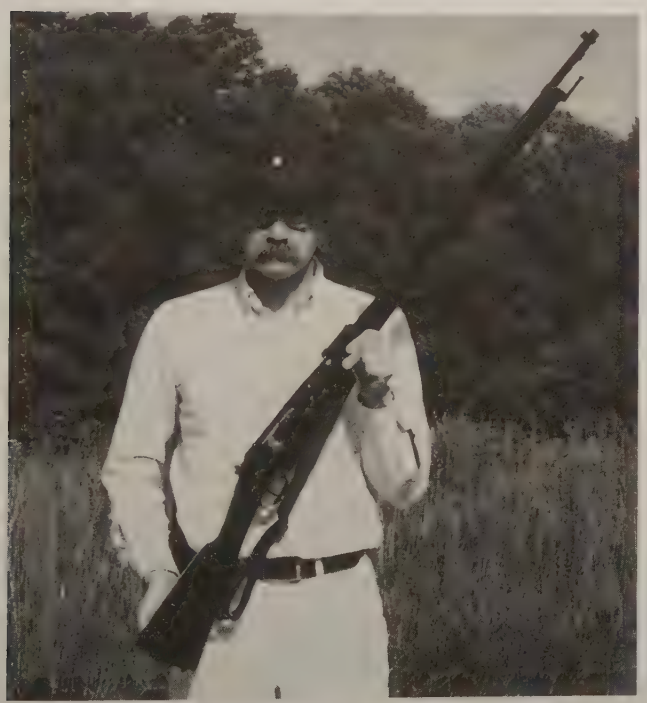
As might be expected, the blast is heavier than that encountered with the R93 and recoil is sharp. Oddly enough, it does not feel as heavy as the recoil I encountered when shooting the same loads in my Berthier 07/15 carbine, but perhaps it is a result of the stock design or the weight of the weapon.

The R35 has a three-shot capacity and a magazine cutoff like the R93. Because it loads through the open action, you cannot top it up when the action is closed, as you can with Winchester or Marlin lever actions.

For some reason, the action on the R35 seemed slicker than that found on the R93, but because they are identical, it seems to me that this was just a matter of the individual weapon I tested and not anything to do with the design. Both rifles have a large cocking



The action of the R35 (right-side view visible in this photo) features a two-piece bolt. The cartridge carrier is immediately under the butt.



The Mannlicher Berthier M07/15 served the French armies faithfully in many difficult battles over a long period of time. It could have been better, but neither the Dutch with the M95, the Russians with the M91 Mosin-Nagant, nor the Germans with the GEWR M98 rifle were any better equipped.

piece on the end of the bolt. This can be used to recock the weapon to allow the shooter to try to get defective cartridges to go off with a second strike, and I used this feature to good end when I was testing the rifle.

The R35 is a nice, light, handy, little rifle that is far better to carry than to shoot. When you consider that this model was made within 12 months of the development of the M1 carbine and within 48 months of the development of the MP 43 rifle, it is clear that, in the period from 1886 to 1939, the French had gone from being in the technological lead to occupying a backwater position in weapons development.

MANNLICHER BERTHIER MODEL 07/15 RIFLE

This rifle was the standard battle rifle used by mainline French forces during World War I; it was also used to a limited extent in early World War II and for various French colonial skirmishes. It was even seen in Vietnam, although rarely in the fighting involving U.S. forces during the 1960s and 1970s. This is a weapon that has seen a lot of action.

The model tested was the three-shot version; this version was later modified to hold five shots—no doubt with the intention of bringing it up to the level of the German M98 Mauser. The rifle tested had been made by Remington Arms on a French contract and was virtually new. I rather doubt that anyone had ever shot it before. Thus I was able to test a weapon very similar to what I would have been issued if I had been a French soldier in 1915. That, I believe, is always interesting since using old, tired examples of a weapon always leaves you wondering whether you would have gotten better results if the weapon was in better shape. No such problem here.

The front sight on the rifle is totally unlike that found on the 07/15 carbine. With the latter, a very large front sight with a slot cut into the top helps the eye pick up the sight in poor light but makes centering the sight somewhat difficult as ranges are increased. On the rifle version, the front sight is square rather than the typically European pyramid style, but it is very narrow and hard to see. The rear notch is a shallow U and very difficult to use. The rear ramp is calibrated from 400 to 2,400 meters, which of course made it very difficult to use at real combat ranges: you are forced to aim at the knees to hit a man-target at typical combat ranges. No doubt this feature saved numerous German lives in World War I. The front and rear sights both lack any protection from injury and are subject to damaging blows.

The rifle, as is typical for French rifles, lacks a safety. Although many people may find this a drawback, frankly, I think it helps avoid problems both with depending on a safety and keeping everyone alert. I much prefer simply leaving a bolt partly open to get me the safety that is needed to relying on awkward and sometimes questionable safeties.

The trigger on both the rifle and carbine versions is quite straight. This tends to cause your trigger finger to migrate to the top of the trigger, causing your fingers to hit the bottom of the receiver. This can throw off your shots. I found that I had to force my finger downward to keep it from striking the receiver, and I believe this is because of the straight trigger. It does add a unique French style to the weapon. The trigger pull is heavy, and the firing pin fall is long and heavy. However, neither feature really caused difficulties in shooting that could not be overcome.

Recoil is mild, and the report is similarly low, especially when compared with that of the carbine version. No butt trap exists to house cleaning supplies, nor is there a cleaning rod. Both items must have been missed greatly in the mud of World War I. Similarly, for a rifle used by a military force that always emphasized the "spirit of the bayonet," the lack of an upper handguard must have been painful. If a soldier has the bayonet affixed and is using the bayonet properly, he will place his left hand over the front portion of the barrel, and if he fires 30 or more rounds before launching the bayonet attack, he will burn his hand. I suppose the soldier charging with a bayonet rarely fired that many rounds prior to the attack.

The rifle is not heavy, although it is quite long. Fortunately, it balances toward the rear so both off-hand shooting and kneeling shooting were easy to do. The length would no doubt pose a real drawback in trench fighting and in urban battles, but it was developed at a time when trench battles were unknown and when many military authorities viewed the rifle as a bayonet handle. Hence, the longer the rifle and bayonet combination, the better for the soldier because his reach would exceed that of his enemy. Why by 1916 the French had not started issuing the carbine version exclusively to trench infantry units, as well as modifying the sights to give a more effective battle zero, is a mystery to me. Certainly, it would have made for a much more effective battle rifle.

As it was, the Mannlicher Berthier M07/15 served the French armies faithfully in many difficult battles over a long period. As mentioned, it could have been better, but their

Dutch counterparts with the M95 and their Russian allies with the M91 Mosin-Nagant were really no better armed. In fact, I am not convinced that France's German opponents with the GEWR M98 rifle were better equipped with regard to battle rifles. The U.S. soldier with his M1917 and the British soldier with his Pattern 14 had superior weapons, but the Mannlicher Berthier M07/15 was certainly not a piece of junk, as many seem to think.

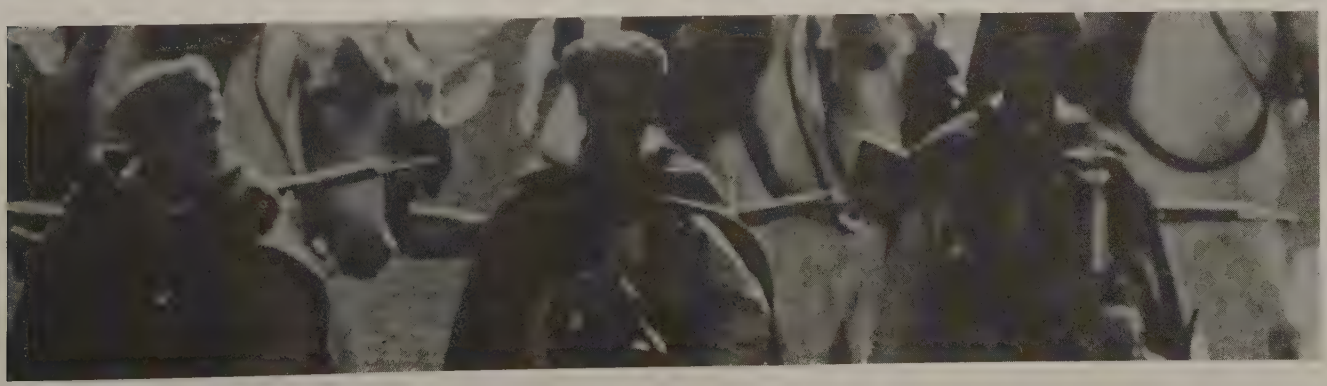
MANNLICHER BERTHIER M07/15—8MM LEBEL CARBINE

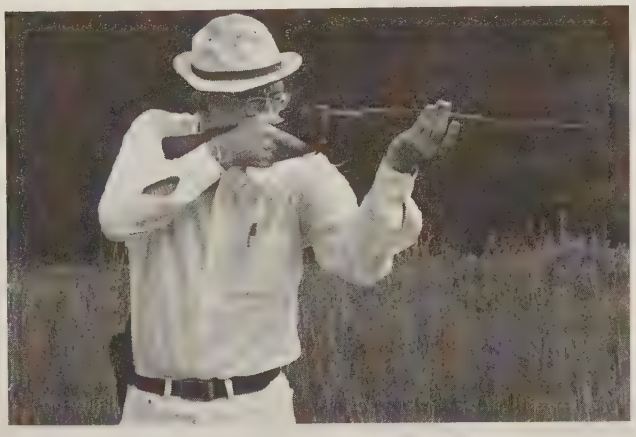
During World War I, the French army used a wide variety of weapons. This was attributable in part to the wide variety of troops in the French service—who ranged from professional soldiers to conscripts, from native Frenchmen to indigenous people who fought under French colors in faraway colonies—and in part to economics.

France was the first nation to adopt smokeless powder and the rifles to go with it. Once this breakthrough took place, the French made many weapons. These designs were soon superseded by better designs, but rather than scrap the old weapons, they were retained for use by second- or third-level (or lower) troops. When World War I started in 1914, all of these weapons were pressed into service.

Some very consistent things exist among French weapons of all types. First, the designs

French colonial troops armed with the Mannlicher Berthier 07/15 carbine in Asia and the Middle East.





The Mannlicher Berthier M07/15 8mm Lebel carbine was designed by someone who understood how weapons were to be used in combat.

all look distinctively French, with unmistakable French flair. Second, they all reflect the fact that someone who was serious and knowledgeable about fighting with weapons, rather than using them as remote-control paper punches, either designed them or at least had input into their design: they are no-nonsense weapons. The sights are uniformly better than other period rifles in other nations. I note also that these last points seem to be missing from post-1918 weapons—I assume that by 1919 all those people who knew and understood how weapons were to be used had died, retired, become disabled, or lost their influence over the weapons makers.

To come up with the Mannlicher Berthier M07/15, the original three-shot model was modified to hold five rounds. This was accomplished by extending the magazine below the wood. Obviously, special clips are necessary to permit the weapon to function with extra ammunition, and perhaps in colonial regions this was a desirable check. In controlling the clips, which are small and lightweight, you effectively reduced the troops to single-shot rifles. When troop loyalty is suspect, this is always a useful feature.

The model I tested was a carbine version, and it naturally brought images of camel-riding troops to mind whenever I picked it up. The weapon was handy to carry and well balanced, which made shooting it off-hand quite pleasant, and its sights are very interesting. The rear has a rather wide-open, flat-bottomed notch with graduations to 2,000 meters. Exactly who expected the troops to use this lightweight carbine at such distances, I do not know, but perhaps as an indirect-fire weapon in the desert before machine guns or mortars were common and when targets were generally oasis or desert forts, the Mannlicher Berthier M07/15 worked nicely.

The front sight is the more interesting. Most European rifles of the period have very small, dark, and pyramid-shaped front sights, which are difficult to see in daylight and impossible in the dark. The French apparently realized this and installed a very wide (approximately 5/16-inch) front sight. Such sights are quick to see in dim light or when firing rapidly off-hand. Typically, as the range is extended, such wide front sights will hamper the performance. The French got around this by cutting a small notch (not all the way through the sight) at the top of the front sight. The shooter would then take the notch in the center of the front sight and use this to align the front sight in the wide rear notch. A six o'clock hold is necessary when using this method, but you can do accurate work with it. I found that I could hit the 10-inch plate at 300 yards with the Mannlicher Berthier Model 07/15 carbine. Somebody was thinking here. If you painted the little notch white or, better yet, white with an overcoat of fluorescent paint, you would have as good a night sight system as many modern rifles today that use radioactive elements and better than anything commonly encountered until the last few years.

The action on this rifle is not like a Mauser's, and I was somewhat concerned about its strength. Still, it seemed to hold up to the 8mm Lebel pressures without difficulty. Unfortunately for field cleaning, you must have a screwdriver to remove a screw to take the bolt from the receiver. The action on the test weapon was quite stiff and slow, thereby limiting my ability to fire rapid repeat follow-

up shots. The trigger pull was light, and it did not have enough slack in it. Rather, when you started pulling, it went off very quickly, much like a commercial sporter. For military use, especially in cold weather, more slack would be a good idea. The trigger guard was also small, and I wonder how people in the trench lines fared in the winter. In the desert, it would not be a problem, but I think it would if the troops wore mittens.

I tested the carbine version first rather than the rifle version because I thought it was so "cute." It is cute, and it is handy to carry and balances well. But the 8mm Lebel is not a lightweight deer cartridge in the .243 class, but rather a real rifle cartridge. This little piece kicked me a lot! The blast is not terrible despite the short barrel, but it really goes off. Even so, I found that I was able to get 4-inch groups at 100 yards with the carbine, even though it had sights that were difficult to use for formal shooting, a trigger that was quite "sudden," a lot of recoil, and, most critically, I was shooting old military surplus ammo that was plagued with misfires and actual 1- to 2-second hangfires. Discarding those, however, and taking only shots that did not *appear* to be suffering from hangfires, I got a nice, 4-inch group. I would imagine with good ammo, I could halve that figure. I was able to hit 10-inch plates off-hand at 200 yards and from the kneeling at 300 yards. Because of the ammunition available, I did not try it at longer ranges.

This is a handy little carbine that is certainly nice to pack around even if it is not pleasant to shoot. But as is said about hard-kicking handguns used for defense, they "quit hurting when you quit shooting." The action is not very smooth, but the sights reflect some very sophisticated understanding of what is truly useful in a battle rifle that designers would do well to consider today.

MODEL 1915 CSRG (CHAUCHAT)—8MM

The CSRG, or Chauchat, is a much undervalued weapon in my opinion. When evaluating this weapon, the shooter must keep in mind that it was made from 1915 to

In my opinion the Model 1915 CSRG (Chauchat) 8mm rifle is underrated, especially considering the fact that it was made during World War I to be a cheap, easy emergency weapon. However, if the shooter places his head too far back, recoil can be a problem. Head placement is correct in this photo.

1918, a period when France was hard pressed to make weapons. It also was made from stampings and simple tubes at a time when more conventional machining was found in weapons.

If viewed as a "Sten gun" (that is, a cheap and easy emergency wartime weapon), the CSRG looks a lot better. It was not designed either to be a gunmaker's masterpiece or even to fire thousands of rounds, since the shooter was very likely to have been killed long before that point. The CSRG was an infantry squad weapon.

Additionally, this weapon was modified for U.S. forces to fire the .30-06 cartridge. The modification may not have been done as well as desired in the rush of wartime production, and the U.S. ammunition at the time frequently was defective. As a consequence, the CSRG got a very bad reputation among U.S. troops. Later, the weapons were offered for sale very cheap (I remember them at $9.95 in lightly dewatted condition—*dewat* is a term for converting a "live" machine gun into a deactivated war trophy), but 8mm French ammunition has always been very questionable in the United States. Typically, it was not stored properly and had a lot of misfires even in bolt-action weapons—which did not help the weapon's reputation.

Still, the CSRG has some strong points. First, it was available. Second, it did not need water as did the German MG 08/15 LMG. It was recoil operated, not gas operated like the Browning Automatic Rifle (BAR). In a day when corrosive primers were the norm, this in itself must have been appreciated by users. Its cyclic rate was low enough that single shots were easily obtained, thereby hiding from the enemy the fact that an LMG was present.

The grip angle was quite straight and thus did not give a natural shooting grip. Additionally, the combination selector/safety was very stiff and difficult to operate. The shooting hand or the off hand had to be removed from the firing position to operate it. It is best to leave it off safe and fire your shots carefully on full auto, in my experience, rather than trusting the selector/safety. The weapon has a foregrip, which was handy for off-hand/hip shooting (although the balance of the weapon was such that true off-hand shoulder-pointed fire was very difficult). The weapon was fitted with a bipod, but it was next to useless because it flopped about too much.

Recoil was not terribly high in contrast to what you would feel in a rifle, but higher than what you would anticipate given the weapon's weight. This is because of the long recoil operating system used. The shooter should

U.S. troops in World War I were armed with the CSRG LMG. In this photo, they are being greeted by the local French people.

The author operates the magazine-release mechanism. This is a right-side view of the CSRG.

use care to place his cheek on the receiver tube, not the endcap, to minimize the recoil force. Unfortunately, the receiver is black and metal, and, even on the mid-90-degree day on which I tested the weapon, it was quite hot on my face. This would be a real problem in the field in either cold or hot weather. If it were my weapon, I would glue a sheet of rubber to it to help keep my face in the right position, minimize felt recoil, and avoid contact with either the cold or hot receiver tube.

The front sight is an unprotected pyramid type, and the back is a notch rear. Both blurred as soon as the first shot was fired and were hard to see. I had to force my cheek down on the receiver to see the sights, which increased felt recoil. I would also recommend painting the front sight white to facilitate pickup in dim light.

The magazine is of flimsy sheet-steel construction and rather difficult to load because of the rimmed 8mm French ammunition used and the magazine's curve. To fit it, you have to make certain that the lip is inserted properly. At times, the recoil would unlatch the magazine, but with a proper magazine, no real difficulties were encountered. Unfortunately, it holds only 20 rounds, so just about the time you get "cooking," you must stop and fit another magazine.

Firing from an open bolt, the CSRG had limited fine accuracy—although I encountered no difficulty in hitting chest-sized rocks at 325 yards from the prone position. When the weapon was fired from the full-auto position, I found that second shots were up left and off target. Subsequent shots were clearly way off target, so restricting fire to two-shot bursts makes the most sense.

Viewed from a contemporary setting, the CSRG is actually quite a nice and effective LMG. Because the CSRG is 8 pounds lighter than a Lewis Gun, I would prefer it for infantry assaults if I had access to good, fresh 8mm Lebel ammunition. As I told its owner, who had so kindly lent it to me for testing, with a CSRG and good ammunition, I feel certain that even today I could soon obtain an M249 or similar "modern" LMG if I applied myself to the tasks in the proper circumstances. Keep in mind that CSRGs are frequently found in the oddest places—I encountered one at an old lady's garage sale only a few years ago that no one seemed to think was anything other than an old rifle that you could not fire because of lack of ammo.

MAS 36—7.5 FRENCH

This was the last rifle adopted by the French army before World War II, and I believe it was the last bolt-action rifle adopted by any major power that represented a new design rather than simply a modification of an old one. Certainly, the Madsen M47 was a postwar bolt-action design, but it was never adopted by a major power, as was the MAS 36.

The MAS 36 did not get much use in World War II because the French forces were quickly out of the war on the Continent, the French forces in Africa did little fighting, and the Free French forces were armed with

French colonial horsemen armed with MAS 36 rifles. The MAS is frequently underrated by those who confuse desirable deer rifle features with those on a combat rifle.

French Foreign Legionnaire with a MAS 36 7.5mm rifle during the early years of World War II.

British- and U.S.-pattern weapons. However, the MAS 36 was used extensively in Indochina in the early days of the war and in Algeria to a greater extent.

I think French rifles of all types tend to get very bad treatment. After shooting this rifle on the range, I went back and reread W.H.B. Smith's comments in *Small Arms of the World* about this rifle. Either Smith had never shot the rifle, or he was prejudiced against French rifles. True, French weapons of all types are a little different than other weapons designed for the same role—they are in fact very "French" in their outlook and appearance, but I find that rather charming, and sometimes I find the design features quite good.

The MAS 36 uses a bolt with the locking lugs on the rear and an odd-shaped handle. In actual tests, this did not feel awkward at all, although I did note that I had to grip the handle with my fingers rather than merely hit it with the palm of my hand as I typically do on bolt-action rifles. The action is very smooth, and although I have to reach forward a little more than I usually do to get to the handle, I certainly did not need to reach forward as I do with a Mannlicher rifle.

Recoil is heavy, as is muzzle blast, but then this is a light, short rifle shooting a cartridge every bit as powerful as a .308. There is no butt trap or cleaning rod on the rifle. A spike-style bayonet is stored in a container beneath the barrel. Merely pushing the button allows you to withdraw it, invert it in the container (which then becomes the mounting point), and you then have your bayonet fixed. Frankly, I am not sold on spike bayonets since you cannot use them for anything except stabbing people. I prefer an edge on my bayonets so I can slash as well as stab. Still, I have to say that this bayonet is very lightweight, and no doubt you could cut through any number of coats and web gear that might deflect a blade-type bayonet. Outweighing this advantage, however in my book, is the fact that it rattles when it is in the

container. Metal rattles can be heard at night when on patrol. If I carried this rifle, the bayonet would have to go. Not only would I save a little weight, but, more significantly, I would avoid the noise. Why designers cannot make rifles that do not rattle is simply beyond me. Are they in league with the duct tape manufacturers?

The paratroop version of the MAS 36 is very clever and very French in design.

The clip-feeding system of the MAS 36 and the excellent rear sight are clearly visible in this photo.

The MAS 36 lacks a safety, and a lot of people have made a big point about this feature. Frankly, I rather believe, as does Jeff Cooper, that safety is in the mind of the shooter. If no manual safety exists, people will tend to be more careful because they will not rely on the mechanical device, which can fail. I never use them on bolt-action rifles anyway because they are too slow for my tastes; I prefer to keep the bolt handle up and slam it closed when I am ready to shoot. Perhaps the French taught their troops the same technique, or they figured their troops would not chamber a round until they were ready to shoot. Or perhaps the French had a lot of accidental or negligent discharges. I would like to talk to some French soldier and find out.

I do not find the lack of a safety at all alarming; in fact, I think it is a sign of a good aggressive spirit. No one finds it odd that a double-action (DA) revolver has no safety, and many people never apply safeties on DA self-loaders. W.E. Fairbairn of the Shanghai Municipal Police pinned down the safeties on his men's Colt .380 and .45 ACP pistols, so why condemn the French?

The sights on the MAS 36 are excellent. The front sight has a pyramid-style front, but instead being pointed, it is flat on top. This allows the shooter to keep the elevation much more consistent. There is a good sight hood protecting it, and the whole sight is mounted away from the end of the barrel, where it is most likely to take hits and damage. The rear sight is an excellent peep unit with adjustments down to a practical 200 meters. It is adjustable and quite sturdy. The whole sight setup is quick to use even in dim light and is far ahead of the sights found on other European bolt-action rifles of the period.

The rifle has stripper clips to load it, and this system is very fast. The trigger was quick and reliable, and that, coupled with the excellent sights and balance, allowed me to shoot quite successfully off-hand on 10-inch plates at 200 yards, as well as at similar plates at 300 yards from the kneeling position.

The MAS 36 may have been obsolete when it first came out, as there were already good semiautomatics on the horizon—but it is actually a much-underrated rifle primarily, I fear, because of prejudice by people who believe that anything other than an M98 Mauser-style rifle is inferior.

The most interesting thing about the MAS 44 is the fact that it exists at all. It was produced during World War II, at a time when the Germans occupied France, yet it still was made in 7.5 French instead of 8mm, which the German military used.

MAS 44—7.5 FRENCH

The MAS 44 is a very interesting rifle mainly because it exists. When you consider that the Germans occupied France at the time of its manufacture, it seems odd that they would permit the MAS firm to spend time developing a semiauto rifle in 7.5 French. I would have thought that the Germans would

have forced the French to make 8mm weapons for their own military forces.

Certainly, the MAS 44 was not a popular weapon, being used only to a limited degree and, to my knowledge, nowhere other than in France or its colonies, but it is interesting because from it developed the standard postwar infantry rifles: the M49 and M49/56, both of which have been used widely in French territories and have proven to be rugged and dependable.

The cocking piece on the MAS 44 is big enough to allow handling with stiff fingers or kicking it open with muddy boots if a case gets stuck.

The MAS 44 looks very much like the MAS 36, except that it is a semiautomatic rifle rather than bolt action. The front part of the rifle is the same with its bayonet-mounting system and well-protected, easy-to-see ramp front sight. The needle-style French bayonet is often deplored, yet it will penetrate targets protected by web equipment and heavy clothing more easily than a blade bayonet and it is less likely to get stuck in the target. You may not be able to use a needle-type bayonet for anything else except sticking a person, but perhaps that is not such a bad goal. However, I like to be able to slash also. The rear sight is similar to the one found on the MAS 36 and an excellent sight it is, with a well-shielded, easily adjusted peep unit with firm settings.

The weapon can be readily stripped by pushing the bottom on the rear of the receiver, a feature that reminds me of the FN-ABL rifle. The bolt handle is located on the right side but is high enough on the action that it can be reached by the left hand, thereby allowing the right hand to stay on the pistol grip (although commonly the right hand is used to cock it). The bolt handle is large enough and checkered, so that cocking it even with cold-stiffened or wet hands would not present a problem. Further, its size and sturdiness permit kicking it if necessary to extract a stuck case.

Although the rifle features a 10-shot detachable magazine, it was not designed to be reloaded with spare magazines, but rather with stripper clips loaded through the top of the action. In this regard, it is like many of the first-generation semiautomatic rifles. However, unlike such rifles as the AG 42B, the magazine is easily detachable, so that if a soldier had managed to get a supply of magazines they could have been used to feed the rifle. I doubt if anyone did so, however, since no spare magazines seem to have been issued. Stripper clips were supplied with the ammunition issued. This system means that you cannot reload the rifle without taking it out of the firing mode, but unlike with an M1 Garand, at least you could withdraw the magazine and manually insert rounds into the magazine and then reattach it if you were so inclined.

The big disadvantage of the MAS 44 is the safety system. Of course, French rifles typically had no safeties, so I suppose it was not surprising that the one on the MAS 44 is inferior. Somewhat reminiscent of the FN-ABL safety, this safety is a lever that is pulled downward, thus blocking the trigger. It is slow to engage in the best of times and would be especially difficult if you were wearing mittens. More important, it is slow to

disengage because the finger must push it to the off position over a long arc—much too slow for rapid response—and it cannot be used at all by a left-handed shooter.

Trigger action is about what you would expect from a semiauto military rifle, heavy with a lot of slack and overtravel. However, the trigger does not prevent good shooting.

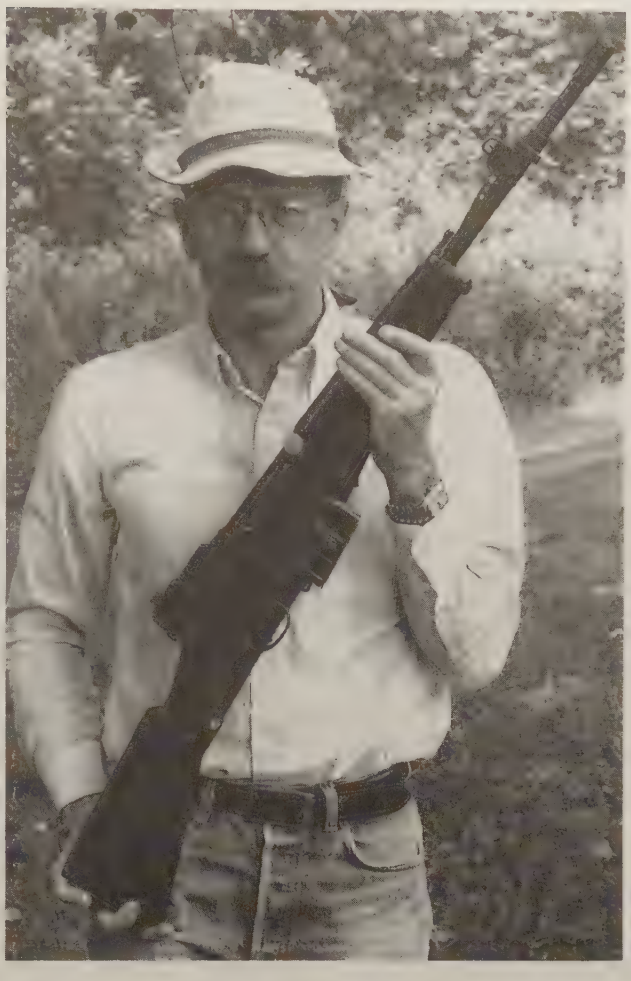
The rifle lacks cleaning equipment in the butt and a cleaning rod. Given the highly corrosive nature of French ammunition and the gas system involved, this seems like a real drawback to me.

The MAS 44 represents an interesting step in the development of post-1940 semiautomatic rifles. In some aspects it is superior to the M1 Garand, yet the designer still did not realize exactly what was needed when the MAS 44 was developed. However, if you compare the MAS 44 and the MP44, the MAS 44 rifle seems to be rather old-fashioned

All in all, the MAS 44 reminds me of the story of the dog who could speak only a few words. The wonder was that the dog could speak at all, not the few words involved. Given all of the circumstances involving its development, it is a wonder that the MAS 44 ever really saw production. The fact that it did shows that the Germans had something less than a firm grip on the French armaments producers.

MAS 49/56

As I indicated earlier, I frankly think that French military weapons are seriously underestimated in the United States. All the ones that I have tested—whether they be handguns, rifles, submachine guns, or machine guns—have been excellent weapons. They all have an odd quirk or two about them that makes them distinctively French, but they are all well-made, accurate combat tools. Occasionally, the French got sidetracked into weak calibers such as the 8mm Lebel M92 or 7.65mm MAC 35/MAS 38, but even those weapons were fine within the limitations of the rather feeble cartridges. Had the weapons had better cartridges or had the cartridges been loaded with different bullet types and to higher velocity (a THV style 7.65mm French, for instance), they might have been successful. Of course, political problems frequently kept the French military weapons from being used in an effective way, but that has no bearing on the either the weapons or the men who used them.



The MAS 49/56 is accurate, hard hitting, light, and handy. My only real problem is with its limited magazine capacity. French soldiers who carried it were certainly as well armed as any U.S. soldier with an M14 or Brit with an L1A1, and had a better, more user-friendly weapon than anyone burdened down with the H&K G3.

The MAS 49/56 is the last in a series of French autoloading rifle designs that started

well before World War II began. Naturally, development got sidetracked by the Great Depression in the 1930s and then the arrival of the Germans, but even so, French designers were well on the way to designing an effective, full-rifle cartridge, capable combat rifle while John Garand was still working on his design in Massachusetts. Such French designs as the M44 and the later M49 were perhaps even better, using as they did a rapidly detachable magazine while still allowing rapid loading from stripper clips at the top. Had the French fielded them with spare magazines and used noncorrosive primers in their ammunition, they would have even been more successful. On this later point, I note always that French ammunition seems very corrosive, and the gas system used on these rifles demands careful attention to it to prevent rust.

French soldier operating his MAS 49/56 in action.

As it should be obvious, the MAS 49/56 is a development of the earlier MAS 49 that came on line with French forces in the mid-1950s. As such, it missed the Indochina campaign, but did get used to an extent in

The left-side view of rifle muzzle area with grenade launcher sight raised and the cutoff up.

Algeria and in all operations in which the French have been involved during the ensuing 25 years. The MAS 49/56 is shorter than the MAS 49 and therefore handier. It is well balanced and can be rapidly thrown up to the shoulder to allow quick reaction. Although it fires a full-size cartridge, the 7.5 French (which is equal to a .30-06 in power), the weapon design and the muzzle break/gas system produce a low recoil impulse.

The sights are good both front and back. The front is well protected against damage and well designed, although I would paint it orange or white if it were my rifle so I could pick it up faster. The rear sight is an excellent sturdy peep, a development from the earlier autoloading rifles and the MAS 36 bolt action. However, it is also adjustable for windage, which is nice. The sights lack a night sight capability, but painting the front sight with flat white paint and then coating it with radium "glow-in-the-dark" paint that is available in craft stores for pennies will solve what normally costs hundreds of dollars in radioactive sight elements on other rifles. Still, paint does wash off with cleaning solvents, and radioactive night sights are nice. I would note that no military rifle had them until the last decade or so, however. As always, civilian shooters lead the way in such developments.

Each MAS 49/56 is equipped with an integral grenade launcher, which has a very fast-to-adjust launching system. Apparently, the French thought very highly of rifle grenades. Although they can be useful, I have always found them to be only marginally accurate and to have a lot of recoil, and I have always worried about shooting a ball round in my launcher rather than grenade-launching blanks, something that will really create problems. But naturally I am a child of the M79 era and thus spoiled. I suppose in pre-M79 days, they looked a lot better—although I never found them very good when I shot them off my M1 Garand rifle as a kid.

The upper handguard of the rifle got quite hot when 20 rounds were fired rapidly, and I believe that a heat deflector would be a nice addition. It was in the mid-90s the day I fired it but I am certain the rifles have been used a lot where it was hotter, so burned hands must be common after firefights.

The magazine release is a side-locking catch, and though it is quite sturdy and quick to release even with mittened hands, the capacity at 10 rounds is too small for my taste. Having used the M14 while I was in the army, I suppose I think of the MAS 49/56 as a French M14; however, it would have made a lot more sense to me if the French had used the 20- to 25-round magazine of the LMG. Additionally, spare magazines should have been issued with the rifle to get the maximum benefit out of the system.

The safety is fast to disengage for a right-handed shooter because it quickly flipped off, leaving me at least with my finger resting on the trigger guard. This is, of course, the ideal position for a combat weapon because now all

that needs to be done is to pull the trigger. By ending up the safety removal sweep with the shooter's finger on the guard rather than the trigger inadvertent pulls are avoided. The trigger guard could have been better designed to permit mittened hands to use it more easily, and the setup is not good for left-handed shooters.

The bolt handle is easy to reach with the left hand while holding the weapon with the right, and it is also a good size and sturdy construction if kicking the handle to extract a case is called for ultimately, which has always been my experience when using self-loading weapons.

All in all, I was quite impressed with the MAS 49/56. It was accurate, hard-hitting, light, and handy. I liked it a lot and am troubled only by the rather low magazine capacity. French soldiers who carried it were certainly as well armed as any U.S. soldier with an M14 or Brit with an L1A1, and had a better, more user-friendly weapon than anyone burdened with the H&K G3 rifle.

FA MAS

French military rifles are often different from other weapons encountered. Even though they frequently appear rather odd in some fashion, actual use tends to show that they have many very fine features. The FA MAS is one of these typical French rifles.

First developed in the late 1970s, the FA MAS is an unusual first in its caliber. For the first time ever, the French military selected a cartridge that was similar to that used elsewhere, the 5.56x45mm. However, it adopted an aggressive, bullpup style at a time when no other major armies were using this style. Although the French army has not fought in any major wars for many years, the

The FA MAS was the first French weapon to use a common caliber: 5.56x45mm.

period since the Algerian campaigns ended has not meant an end to French army work: French troops have been deployed all over the world in a variety of military actions that can get you just as dead as the biggest of wars. Thus a lot of experience in individual infantry combat is reflected in the FA MAS.

The most obvious thing, of course, is that it has a short overall length while still featuring a barrel of about 20 inches to permit the velocity of the 5.56mm cartridge to be maintained. Such short overall rifles are always handy when used in vehicles and around structures; however, they are often criticized because shooters find it difficult to shoot off their left shoulder when operating in urban combat areas. Generally, this problem can be resolved by tipping the rifle on its side or head and having the shooter take a step or so back from the obstacle. For the most part, I believe this problem of not shooting off the weak shoulder is blown out of proportion, especially given the poor performance of the average shooter when firing off the weak-side shoulder.

However, the FA MAS, unlike the British L85A1, can be reconfigured to permit left-hand operation, no doubt helpful to that 11 percent of the population born left-handed. Additionally, this switch from right- to left-handed can be done in the field so a left-handed soldier with a defective rifle could assemble a rifle for himself from a fallen comrade's weapon. With an AUG, special replacement parts are necessary, which are not likely to be available in the field. With the L85A1, such a reconfiguration is simply impossible.

On the FA MAS, iron sights are typically fitted. Additionally, the sight radius is quite short and thus limits the shooter somewhat. Obviously, misalignments with a shorter radius sights have bigger resulting margins downrange than similar misalignments with longer-sighting radius weapons. However, the sights themselves are quite nice. The rear sight consists of three alternative peeps: one is small for fine work at a distance, the standard one is good for typical engagement distances and quicker to use than the finer peep unit, and the third is a big ghost-ring-type sight. The ghost-ring type is just the ticket for flying clays, but, more critically, it is designed to be used with the front-mounted night sight. The front sight is a standard blade unit, and the night sight is a separate unit that slides into place. It is large, easy to pick up, and has a hole through it to permit the shooter to see his target in dim light.

Both the front and rear sights have good adjustments to allow the weapon to be properly zeroed and the sights are well protected by the plastic housing that makes up the top of the weapon. This housing also provides a good handle for those who prefer to carry their weapons like luggage. I do not.

Both the L85A1 and the AUG use optic sights for the most part. Although some noninfantry units are equipped with iron-sighted L85A1 rifles, actual combat troops use the SUSIT system. That scope truly makes the L85A1 rifle; it is very effective and quite handy. Although people typically think that scopes will slow up response time, I was able to shoot flying clays with my L85A1 using the SUSIT. Similarly, the AUG uses an optic unit, although it is of a lower power, so I was able to shoot flying clays easily with my AUG as well. Because of the low-power magnification of the optics fitted to the AUG, it is pretty well impossible to get hits on man targets beyond 300 meters with the AUG, as you can with the L85A1. Within that distance, the AUG is quite fast, however. Thanks to the higher magnification of the L85A1 scope, recently I was able to hit 36-inch targets at 996 measured meters by putting the SUSIT at the 800-meter position and then thrusting the translucent pointer over the target to drop the rounds onto the 36-inch plates. With an AUG, that would have been nearly impossible: the design of the reticle precludes the shooter from making precise aiming adjustments at extended distances.

The FA MAS lacks a cleaning kit or rod, but the pistol grip contains an oil bottle,

which is a nice touch. A complete cleaning kit in the butt (such as the one on the AUG) would be better, however.

The trigger guard on the old model FA MAS tested was made of spring steel. Pulling down on it causes it to slip off the stud, and it can be pivoted forward. Then the shooter can get to the trigger when wearing mittens (gloves are less desirable than mittens when it is really cold). In many ways, the trigger system then looks like the Finnish M60 trigger design. Such winter trigger systems are a good idea if you are outdoors in cold weather. Newer FA MAS rifles use the trigger guard system modeled on the AUG and, if anything, are better than the old swinging trigger guard design.

The safety on the FA MAS is big and quite obvious. This allows it to be flipped off rapidly while shouldering the weapon and yet permits the shooter to tell instantly the condition of his weapon in the dark.

The 5.56x45mm cartridge is a "hot" cartridge, and a few magazines fired rapidly will quickly make the weapon very warm. On the FA MAS, the forearm does not touch the barrel, and a lot of space exists between the barrel and the forearm. Additionally, it seems to have a heat deflector built into it, and, thus, the forearm remained fairly cool even with a number of quick magazines fired through the weapon.

Current bullpup 5.56x45mm rifles in use: (top) Steyr AUG; (middle) FA MAS, (bottom) British L85A1 with SUSIT scope sight.

To load the FA MAS, insert the fully loaded magazine with the weak hand while your strong hand maintains the firing position. Take the front edge of the magazine and butt it up against the front of the magazine housing to make certain it is in the proper position.

The FA MAS (bottom) compared to the Colt M16A2 (top).

One of the problems of most bullpup designs is releasing the empty magazine. *Do not rock it into position as you would on a SIG 550 or AK-47 (AKM) rifle.* Unfortunately, old model FA MAS rifles, like the one tested, lack a hold-open device that is engaged when the magazine is empty (the latest models that are adapted to the M16 magazine have this feature). For users of early-model FA MAS rifles, a few tracer rounds at the bottom of the magazine will have to suffice as warning that they have reached the end of the magazine; however, given the trouble I always have with 5.56mm tracer ammunition's being dull and easily overlooked (not to mention setting the woods on fire), I am not convinced that this is a fail-safe solution.

One of the great difficulties with all bullpup designs is that the trigger must work around a lot of angles and have a lot of distance to travel. As a consequence, trigger pulls are never crisp or certain. A good trigger pull is the key to getting good results, and the FA MAS trigger pull is full of creep and slack. It is also quite heavy. Off the bipod, it does not matter because you can overcome it. Likewise, at close range, it also does not matter because you can slap the trigger and get quick rough results. However, at 300 yards from the kneeling or sitting position, getting a smooth trigger pull becomes much

more important. Missed shots typically result from poor trigger pull, rather than the short radius of the sighting system, since being off even a little on the pull will have greater than usual results with the FA MAS.

Overall, the FA MAS is a fairly light, handy rifle that readily balances between the hands. A better trigger pull, an optical sight such as the Elcan unit, and a hold-open on the magazine system would be definite improvements, but the French soldier does not have a poor rifle to take into combat, by any means. It is quite "French" in many aspects and quite acceptable.

Germany

GEW 88

The GEW 88, or the so-called Commission Rifle M1888, was the first Mauser rifle used to equip German troops. Mauser rifles equipped German forces until 1945, and only the destruction of the plant ended the practice. Even today, rifles built in the same area are used by German forces.

The M1888 was apparently the result of a military commission attempting to determine what were desirable features in a military rifle. It was a different design from subsequent rifles and used a different bullet diameter—later rifles used the 8mm cartridge case of the same dimension; these early M1888 rifles used bullets of .318 inch in diameter rather than the later .323 inch. Using the later .323 inch or "S" cartridges in a weapon chambered for the .318 inch or "J" cartridge should be avoided. People still do it, and rifles over 100 years old hold up; I believe

Pre-1914 German forces armed with M1888 "Commission" rifles.

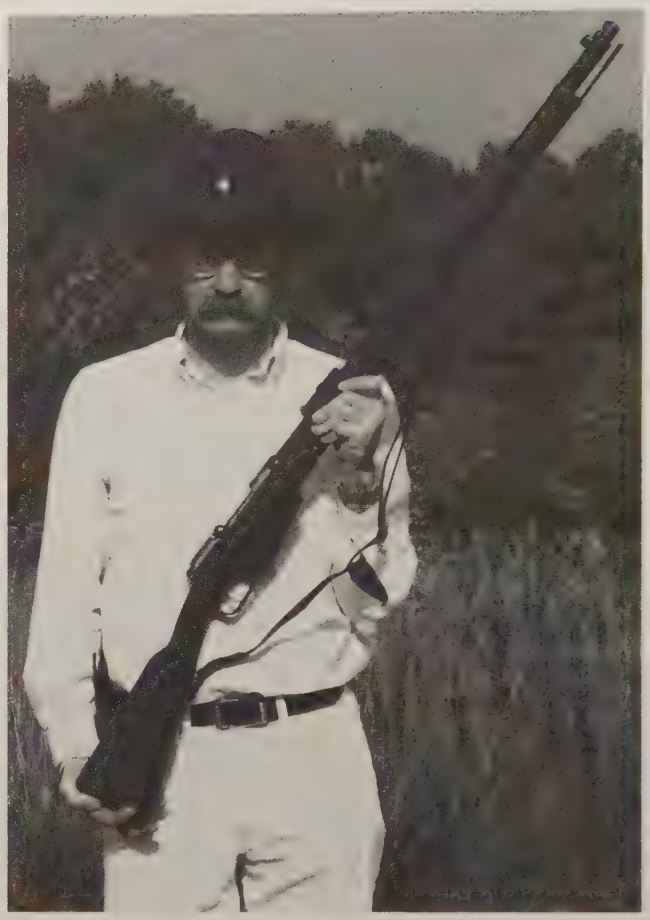
that this is more a compliment to the designers and makers than it is to the intelligence of the persons who do it.

The M1888 uses a muzzle jacket and has no upper handguard. All such designs have problems with rusting and getting hot in the sun. Later rifles avoided the problems, although the Belgians labored on with their M1889 design for more than 30 years. The Germans soon realized that this was a bad idea and discarded the muzzle jacket.

Oddly enough, it would seem that because of a test example made in Danzig in 1891, which had a highly polished receiver, Mauser rifles kept that very same feature until late in World War I. But as a matter of fact, only the disappearance of polishing compound by that time in the war led to the practice's being discontinued. How the military kept the rifles from rusting is a mystery to me, as is why the Germans used a polished receiver. I would also like to know what the German soldier trying to remain concealed from his enemy thought of the design. We painted our rifles in the U.S. Army to avoid shine, but somehow I do not see pre-war Prussian soldiers doing that.

The front sight is a typical unprotected, pyramid type, and the rear sight is likewise unprotected. In the lower position, the rear sight has a battle setting of 400 meters; in the up position, it ranges from 500 to 2,050 meters—which are not practical ranges. This problem would plague German infantrymen in the trenches and would not be corrected until the late 1920s. The V-shaped narrow rear sight was hard to see through, which also affected results on target.

The safety is the wing type and locks the action when applied. It is similar in appearance to a Krag safety but, unlike the safety on a Krag, is very stiff and slow. It is best to leave the bolt handle up slightly and close it when ready to fire. Although this is a Mauser-designed weapon, it has a single-column magazine extending beyond and below the stock and has a bolt handle positioned between the receiver front and back. It thus appears to be a Mannlicher design, but it is not. The bolt handle



Even today, well over 100 years later, these M1888 rifles are in use.

The polished receiver of the M1888 would have been difficult to maintain in the field. Note how the barrel jacket fits against the receiver.

and knob are big enough to allow fairly fast use of the bolt.

On the test example, the trigger pull had some slack in it, but then was very light. In fact, the pull on the test example, which showed no sign of modification, was so light that it would be very hazardous in ill-trained hands. It was quite helpful for both off-hand and kneeling shooting, however.

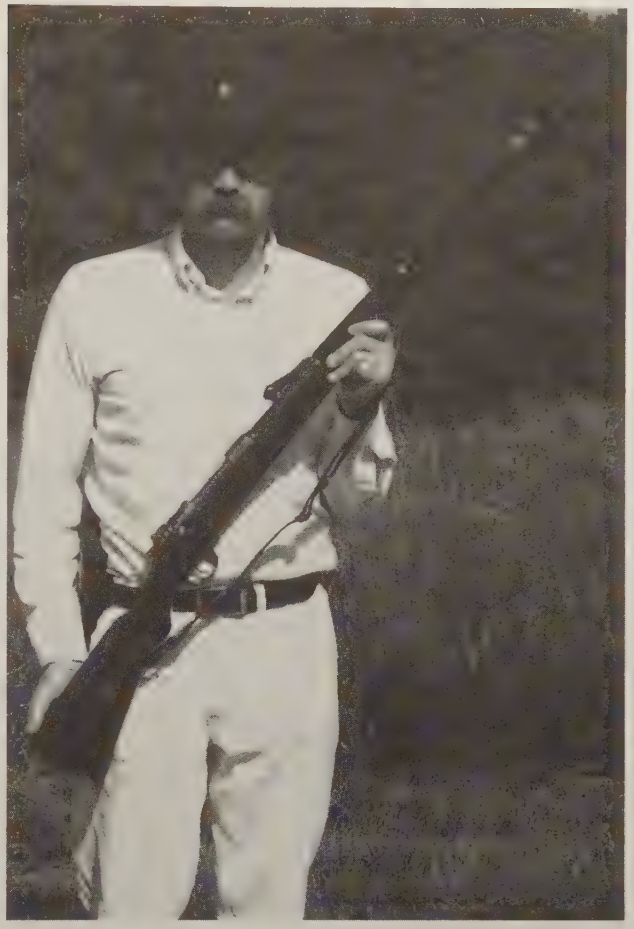
The weapon has no cleaning equipment in the butt, but did have a cleaning rod slung under the barrel. Although this arrangement is not as good as an oil bottle and brushes in the butt, it at least gives you some equipment immediately at hand to push out stuck cases and mud that clogs the barrel. Because this rifle was long and unwieldy, I expected it to be muzzle heavy; surprisingly, it was not, which made off-hand and kneeling-position shooting much easier.

The M1888 Commission rifle was actually a good first step. By adopting it, the German military got a rifle that was common to all areas of Germany (remember, there were different armies in Prussia, Bavaria, and other parts of the recently unified country), and it also got a clip-loading repeater that shot a high-velocity, smokeless cartridge when most of the rest of the world still used single-action, large-bore, black-powder rifles. Unlike the French, however, the German arms manufacturers did not stand still; they continued to develop even better Mauser rifles to arm the troops until their rifle was the one by which all others were judged.

Even today, well over 100 years later, these M1888 rifles are in use, and in a deer camp in 1992 I well remember seeing one, which probably had been sporterized 60 years ago, in the hands of a someone who likely did not understand what he had in his hands. That is a pretty good track record for a rifle in my book.

M98 GEWR—7.92X57MM

This was the standard infantry weapon of the mainline German forces in World War I and was also used to a limited extent in World War II. This rifle had a number of features that seem odd to me, but I suppose they made sense at the time. Until very late in World War II, when there was a desire to speed up production, the receivers received a high polish and were left shiny. Similarly, the bolts were also polished brightly. To a person who spent his late teens and early 20s painting his rifles to break up the outline, not to mention taking care that the rifle had no shiny bits on it to reflect sunlight, this seems very odd. But the Germans persisted in this until production demands halted it. I have never seen an M98



Although the M98 has one of the strongest and best actions around, the rest of the rifle left a lot to be desired. It is an ill-balanced and slow-to-operate rifle cursed with an unfortunate set of sights. The Enfield Pattern 14 or M1917 stands head and shoulders ahead of this rifle as a battle rifle.

GEWR with the receiver painted matte, so I must conclude that German troops did not find it a real problem. It is odd, just the same, as I would imagine a bright receiver ring's giving you away.

This rifle is sighted, as was typical for period rifles, from 400 to 2,000 meters. I understand that German troops in the World War I trenches found this sighting ineffective and were constantly trying to fit higher front sights or take other steps so that it would shoot to POI at 100 yards, which was a much more typical range in the trenches. However, their concerns apparently never made it back to the factory: the rifles continued to be fitted with a very expensive and involved rear sight that I am fairly certain was rarely if ever used after 1914. Not only was this rear sight expensive to make, but also it was "busy" by virtue of the large ears on each side of the actual rear sight blade. This feature caused me to slow my target acquisition as my eyes hit the wings and then had to spend valuable time looking down trying to find the blade and the very small and shallow V notch. The front sight is the typical pyramid shape and has no protective wings. The whole setup is difficult and slow to use.

A German soldier armed with a Mauser Model 98 rifle guards his fellow soldiers, who pause before launching another assault during World War I.

The rifle feels muzzle heavy to me, and that made off-hand shooting difficult.

Kneeling is even more difficult because of the poor balance caused by this muzzle heaviness. The long barrel minimizes muzzle blast and flash, but recoil is surprisingly high, given the weight of the weapon. Perhaps it is because of the shape of the stock and butt plate, and, of course, the 7.92x57mm cartridge is a full-size rifle round without question.

Oddly enough, this M98 action has no bolt-hold-open device. Mauser had developed this device by the time the rifle was introduced, and many people thought it was a good idea because it alerted the shooter that the rifle was empty. German military authorities disagreed, and throughout the war the rifle was made without this feature. Interestingly enough, when the postwar German army adopted the M98 K, the bolt-hold-open was part of the design. Later, when the German army adopted the G3 rifle, the hold-open device was again missing. I rather like the bolt-hold-open and find it useful. In my rapid-fire drill with this rifle, I managed to close the bolt on an empty chamber and snap it empty. On the test, this meant nothing but in battle, this could potentially get me killed. I see few drawbacks and many benefits to such a feature.

The rifle does have drawbacks: the front sight lacks a sight hood, the butt plate is smooth and tends to slip off the shoulder (which slows up reloading speed), and there is no trap to contain cleaning supplies (although a cleaning rod is slung under the barrel). Even though the rifle tested was made in 1912 and appears to be well broken in—though not abused by any means—the action seems very stiff. That slows up shooting speed. The sights

German mountain troops in World War I armed with Mauser M98 carbines.

are very difficult to use and ineffective at trench-warfare ranges, and the weapon had the typical Mauser safety problem.

I have little doubt that although the M98 has one of the strongest and best actions around, the rest of the rifle leaves a lot to be desired. The M98 GEWR is an ill-balanced and slow-to-operate rifle cursed with an unfortunate set of sights. The Enfield Pattern 14 or M1917 stands head and shoulders above this rifle as a battle rifle. Oddly enough, after the war when the Germans had a chance to design a better battle rifle, they really did little to improve it other than shortening it a bit. Obviously, ground pounders do not get listened to in any army!

MG 08/15

During the early days of World War I, the tripod-mounted machine gun dominated the battlefield. The German Maxim 08 MG proved to be an extremely reliable, hard-hitting weapon, but it was not light or easy to carry. It could be used to fire long bursts but really was too heavy to provide close-range support work in the closing stages of an assault. The British army had its Lewis LMG and the French had the CSRG LMG (or machine rifle, more accurately), but the Germans lacked a light machine gun.

Much thought went into the project, and although the resulting MG 08/15 LMG was no doubt disappointing to the German infantryman in many regards, it must be recalled that Germany was pressed at the time on both sides by a large number of Allied soldiers and that time was critical. The German military did not have the luxury of time to develop the LMG, but rather had to take what was available and improvise. The German army was never famous for its ability to improvise, so it was not surprising that the MG 08/15 lacks a lot as a light machine gun.

The MG 08/15 is perhaps the most common German machine gun of World War I. At one point in time, it was anticipated that two per platoon would be issued. Even today,

The MG 08/15 is not a very effective design, but it must be remembered that it was produced under emergency conditions. However, I suppose that German infantrymen, who had nothing to accompany their riflemen in the closing stages of an attack, found it better than nothing.

the MG 08/15 is commonly available and low in price, in comparison with other pre-May 1986 machine guns that are transferable.

The MG 08/15 basically is the MG 08 with a slightly modified receiver; a separate, smaller water jacket; and a buttstock plus pistol grip. It still uses water to cool it and a belt to hold the ammunition. Maxim cloth belts are frequently less than acceptable because of shrinkage or expansion from moisture. Belts, by definition, are awkward when used with hand-carried automatic

The Maxim 08/15 can only be fired easily from the prone position. Note the steam exiting the weapon as it is fired.

weapons (ask anyone who has carried an M60 LMG). The weapon is not light (except in contrast to an MG 08) at 43 pounds (with water) and is long at 53 inches overall. Even these figures do not really make it clear how badly the MG 08/15 fares when compared with the Lewis or CSRG. Although the Lewis and CSRG are difficult to use from the shoulder in an off-hand position, they can be fired easily from the kneeling position. The MG 08/15, at nearly 35 percent more weight than a Lewis, is not something I can hold off-hand and fire. Not only is it too heavy, but the weight is distributed badly; it is very heavy at the muzzle end. Firing from the kneeling position is a little better, but it is only in the prone position that the MG 08/15 can be used with ease. Although it is no doubt easier to drag through the mud than an MG 08, the MG 08/15 is still a lot more difficult than a Lewis, not to mention a CSRG or BAR.

The rear sight is a nicely calibrated peep unit, which I rather doubt anyone really ever used beyond 800 meters, because the weapon lacks a tripod. The front sight is dark and difficult to pick up rapidly. It needs to be painted white or some other contrasting color.

The shoulder stock is rather awkward looking and quite massive but feels surprisingly good. It lacks a place for cleaning equipment, but I suppose that may not be as critical for an LMG as for a rifle because the LMG is a crew-served weapon and it should be accompanied by its spares at all times anyway.

The pistol grip is small and altogether too ropelike in feel—plus the grip's cylindrical shape allows the weapon to twist in your hand if you try to hold it with only one hand. If the grip was more slab-sided, it would allow greater directional control.

The safety does fall readily to the thumb, which is a good quality, and the slow cyclic rate of about 450 RPM (depending on ammunition, of course) allows firing single shots without introducing the added complexity of a selector. I do not have much use for a safety on machine guns generally, but in a static situation such safeties are useful. Just do not use them on a weapon while going forward on the march as you would with a conventional rifle.

The MG 08/15 certainly is not an ideal LMG, but it must be remembered that it was produced under what can only be described as emergency conditions. I do not believe it is a truly effective design, nor apparently did the German general staff, which quickly brought about the development of superior weapons. However, I would suppose that German infantrymen, who had nothing to accompany them in the closing stages of an attack, found its introduction comforting—especially if carried by others in their squad. Also, the fact that the MG 08/15 is common and came into the United States (at least) a long time ago has some obvious benefits that I am certain many readers will quickly grasp.

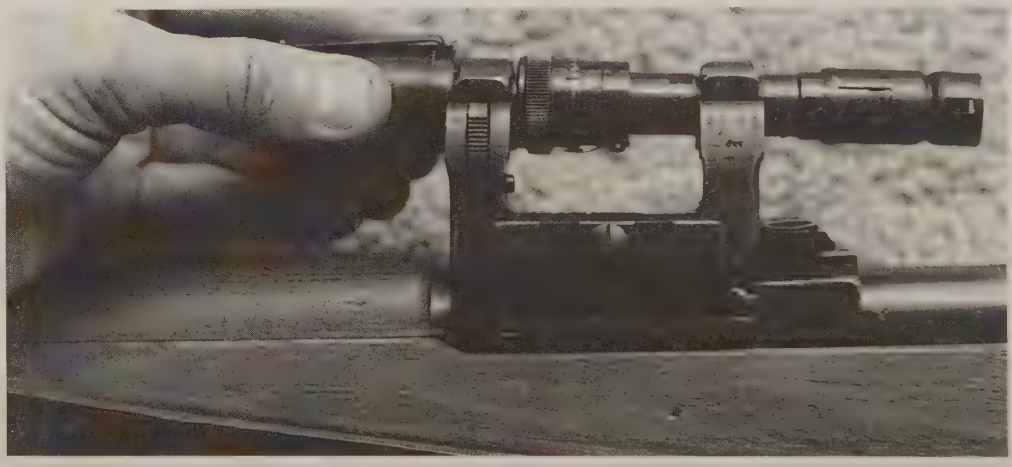
M98 MAUSER SNIPER WITH ZEISS 1.5X SCOPE

The German high command during World War II apparently decided to ignore the

battlefield request for a 4X scope to be used by snipers and developed instead the 1.5X unit tested here. These were to be mounted on standard K98 Mauser rifles. The mounting brackets were installed on many more rifles than ever were fitted with telescopic sights.

The Mauser 98 rifle selected apparently was not modified in any way, although it was intended to be used for special purposes. The trigger pull was standard, and no special fitting was evident on the example tested. The regular iron sights on both front and rear retained a pyramid front that was well protected and a V-shaped notch rear sight.

This Mauser M98 "sniper" rifle is fitted with a Zeiss 1.5X scope. Although the rifle is typically referred to as a "sniper rifle," the scope's poor optics, limited field of view, and low magnification lead the author to believe that this combination was designed to allow German soldiers to hit normal targets more easily, but not to provide a true "sniper" rifle.



The scope can be removed and reattached instantly, but removing it causes the POI to shift, so it is not a good idea to remove it unless the shooter can rezero the weapon.

On the test example, the scope is a 1.5X unit that has a long eye relief, allowing it to be mounted on the right, about where the ramp rear sight is normally located on an M98. The reticle consists of a post reticle coupled with a crosswire to help the shooter avoid canting. The sight is quite dark and has a narrow field of view. The scope is detachable, but (as with all such units) once removed and replaced, the POI shifts. It would be better to leave it in place. The forward mounting of the scope does allow the normal safety to be used, and this also preserves the option of clip loading. The scope is graduated from 100 to 800 meters—however, I question how effective this very dark, narrow-field-of-vision scope would be beyond 600 meters.

The rifle tested was ill balanced and very muzzle heavy. As a consequence, I found off-hand and kneeling work very difficult, and my results were poor. With my M700 Remington with Leopold 1.5 x 5 power scope turned down to 1.5X (to duplicate the M98

with Zeiss 1.5X scope combination as much as possible), I got much better results on my 10-inch plates primarily because the Remington has superior telescopic sights and is balanced correctly for either off-hand or kneeling use.

I am not totally convinced that the Germans thought that this rifle and scope combination could be effective for sniping. Rather, I believe the purpose behind this combination was to give frontline troops a rifle that was more accurate than the standard M98 rifle—or, at least, a rifle that could be more readily used to deliver the inherent accuracy available. In that regard, it is rather like a Cooper "Scout" rifle. However, wartime restrictions prevented the Germans from issuing all the rifles and scopes that they wanted. Had they been able to do so, and also overcome the inherent extra maintenance problems associated with telescopic sights on battle rifles, I believe casualties on the Allied side would have been much higher. Rather than calling this a sniper rifle, however, I believe the term "marksmanship rifle" should be applied.

M98 MAUSER

The Mauser M98 was the final development of the Mauser bolt-action rifle design. Even today, almost 100 years later, no better bolt-action rifle has been designed. Most currently produced actions are either copies of the M98—usually cheapened to make them easier to produce—or clearly inferior.

The M98 action allows for a cartridge of high pressure and great power to be used. You can melt the brass before you blow up an M98. Additionally, the action is extremely reliable. This is not just a reflection of the way the action is designed, but can be confirmed by actual field testing. There is literally no place on earth that an M98 has not been used to one degree or another and found to be reliable.

There are some things that I do not like about the M98: (1) The safety is slow, although I admit it is very positive and safe, and (2) the action cannot be manipulated as quickly as that of a Lee Enfield, not to mention a Schmidt Rubin, nor is it as good in the mud as the Lee Enfield. But the M98 will still be in one piece with loads that will blow up a Lee Enfield and if you are looking for the best in accuracy, the M98 with its more rigid lockup is better than a Lee Enfield.

When we discuss the M98, it must be recalled that we are really discussing an action only. To this action can be added any length or shape of barrel in lots of different calibers. That barreled action can have a wide variety of sights attached to it, and the whole thing can be put in a variety of stocks. All the resulting rifles look and feel slightly different, but all are M98 rifles and have the same basic reliability and quality. Additionally, the action has been produced in a variety of countries at different times. Some places made better actions, more finely finished than others, but underneath they are it all the same.

Before 1914, Germany made M98 Mausers and sent them all over the world. This makes the collector who can see all sorts of variations of design and national emblems very excited. South America was a boom market because the countries on this continent had no ability to make the weapons; whereas the United States, which had previously supplied military weapons such as the Remington Rolling Block, simply had nothing to compare with Mauser rifles. European countries either used Mauser products or their own less sophisticated designs.

The arrival of World War I cut off the source of Mauser rifles from Germany, and when the war ended, there was a period when the Mauser factory could not supply weapons. The slack was taken up by FN in Belgium, which likewise made excellent weapons and offered almost any variation a nation's generals thought useful. Some countries in what we now call the "Third World" began production at that time, resulting in even more variations.

Germany eventually got back into the arms business and started selling weapons until its efforts were diverted again to its own growing

military in the period leading up to World War II. FN kept selling arms to the world's nations until 1940, and foreign arsenals made their own during the war. During the war, German ordnance experts assumed control of weapons production in the captured territories to the degree they could, turning out copies of Mauser M98 for German troops. These foreign-produced Mausers were made to a fine standard. My test example of the latest World War II pattern K948 was a Czech-made copy of the M98. After the war, both FN and Brno in Czechoslovakia continued to make the M98, as did foreign arsenals—which is why you see so many M98s in excellent condition on the market: those guns saw no war.

In the late 1950s, self-loading rifles finally displaced the M98 from the world's armies, and the M98 was made only for hunting, target, sport, and police and military sniper purposes. Even today, FN makes an M98 and sells it worldwide for those who need the accuracy that comes with an M98 that is properly barreled and stocked. It has always been a source of some amusement to me how manufacturers will labor to make a semiautomatic sniper rifle. They are incredibly expensive, and the best they will do is about the same as can be done with a standard bolt-action M98 of good quality.

Although the M98 may have been put on the back burner in most of the world's armies, today they are still being used in the field in all sorts of wars and rebellions. Further, given the quality of the weapons and the design, I imagine that they will continue to exist until the time comes that self-contained cartridges are technologically obsolete, just as flintlocks are today.

Frankly, with the hundreds of M98 designs available, all slightly different, writing this chapter became a potentially expensive and time-consuming project that almost spelled the doom of this whole rifle book project before it started. How could I properly test the M98, certainly one of the most significant rifles in the 20th century? Unlike Enfield rifles with its various marks—which are only of interest to the British/Imperial collector and all of which rather look the same, at least at first glance and without your reference book in hand—the various M98 types all look different, at least to my eyes.

After giving this matter great consideration, I decided I could be intellectually honest by picking a few of the most important and interesting variations to actually test since most of what is good and bad on the M98 is the same throughout the series, cosmetics and caliber being the real distinguishing points.

With this decision made, I reviewed all of my Mauser reference books and decided that I could summarize fairly the M98 if I picked the following examples:

1. *Gewehr 98*. This 7.92mm rifle with 29.1-inch barrel was the standard service rifle of Germany in World War I and was used to an extent in World War II.
2. *Kar 948 K*. This rifle with its 23.6-inch barrel was used as the standard German service rifle in World War II and was common throughout Europe and Asia during the 1930s because it was sold or copied by others. Naturally, the test example was a 7.92mm.
3. *M98 rifle in 7x57mm*. I chose this mainly to test what was commonly sold in Latin America in the period after World War I and before the general adoption of the 7.62x51mm NATO round in the late 1950s.
4. *Gewehr 33/40*. This Czech variation was commonly used by German transport and mountain troops in World War II. Its 19.25-inch barrel made it an eye-catching piece, and it was lighter than the other examples commonly issued to German units. I imagine a mountain trooper carrying his rifle up hills and around overhangs appreciated both its length and weight.
5. *Iranian M30 or Model 49 Carbine*. I picked this only because its 17.91-inch barrel makes it so cute. I like short-barreled, rifle-caliber weapons, and these are found in wonderful condition, frequently with their

1930 test targets attached. Chambered for 7.92mm, they have a lot of blast and recoil, however, and remind me of airweight Chief Special Smith & Wesson revolvers with hot .38 Special ammunition—nice to carry but not nice to shoot.

Let us take the common points on these weapons and evaluate them. All chamber a real rifle cartridge, none of this 5.56x45mm or 7.62x39mm stuff. Each chambers a cartridge that is more than suitable to drop a 1,500-pound animal. More to the point, however, high-quality specialty military ammunition (e.g., tracer, armor-piercing, incendiary) has been developed. Although most people shoot standard ball in these rifles, it is only fair to note (especially with the 7.92mm guns) that some really fine special-purpose ammunition is available. If you have any use for a rifle, laying in some of this ammunition is worth the effort of locating it. A slight aside here to illustrate my point: I recently encountered a man who has a 37-foot ocean-going boat who was concerned about pirates. He had been attacked once and drove them of with a shotgun. I suggested an M98 carbine loaded with armor-piercing, tracer, or, better yet, armor-piercing incendiary rounds. I think such rounds would certainly take care of any commercial wood or fiberglass boat he was likely to encounter, and the rifle is cheap enough that he could throw it overboard, if need be, without sustaining more than a $150 loss.

The rifles I evaluated all have pyramid front sights coupled with tangent rear sights. Frankly, I find such a combination very difficult to see and use. The sights also all are adjustable to ranges considerably in excess of what infantrymen actually shoot at today. I can understand why the Gewehr 98, which was introduced before it became apparent that rifles were not to be used as indirect-fire weapons, has such a sight, but why the these sights continued to be placed on rifles after that is a mystery to me. It seems like a lot of machinery with very little benefit to be had. If you took every M98 rifle in the world and asked it to talk, I doubt that any could legitimately claim a victim shot beyond 600 yards, and most would be lucky to have claimed one at 300 yards. Hitting targets that are not on formal target ranges is hard enough at 400 yards for even good shots. When you consider the level of training and skill available in most armies, the prospect of hitting targets at great distance goes down tremendously.

All the various M98s evaluated take bayonets. Such devices are no doubt nice for controlling riots or guarding prisoners, but I have always doubted whether bayonets are worth the time to make them. I am the only person I know among all my friends and acquaintances who have been in the military who has ever stabbed anyone with a bayonet, so I remain skeptical. Also for those who may not know it, affixing your bayonet affects your POI quite a bit.

Unlike typical military rifles today, the M98 cannot be readily removed from the stock for cleaning. In fact, on some models the screws holding the barrel band in place are not slotted but rather set up for special wrenches that, in practice, makes it impossible for the individual soldier to remove the stock. As a consequence, maintenance is often neglected on the parts not easily seen. Fortunately, the barrel's rusting on the underneath side will not affect the weapon's shooting. The weapon has no gas system, obviously, and thus cleaning it is easier than would otherwise be the case, so frequently you will find the rifles have excellent bores. Most of the rifles you see with pitted bores are, I believe, battlefield pickups as the last shooter was either killed or captured and the weapon was not immediately cleaned, which is required with corrosive ammunition.

The bolt handles on M98 come in a variety of patterns from turned down to straight out. Those of us who originally viewed surplus 98 Mausers as only suitable starting places for sporters tend to look down our noses at handles that stick straight out. In

fact, at one time, a minor industry existed just to turn these handles down. However after testing them the way they are supposed to be used, I have concluded that the straight bolt handle is slightly faster to use and operate. Unless you need the bolt handle turned down for carrying over your back or on your horse, you are probably just as well off to have it straight out. Bolts on M98s typically have a high-polished finish. Why this should be so I do not know; it would seem that a dull finish would be better. Late World War II guns typically do not have the high polish and are probably better from the practical standpoint for combat, although I suppose some of the old-time gunmakers hung their heads in shame because they felt they were not doing their jobs properly by omitting the polish.

Trigger pulls on the M98s are all about the same—pull up through the slack to about 6 pounds. Only in recent years, when I had commercial bolt actions discharge as I rapidly slammed the bolt, thus jarring the firing pin out of the sear, did I understand why these military rifles have these two-stage pulls: they are safer and more reliable. If you learn to pull it up, you quickly find it makes no difference, and the last part of the pull is better than you find on product-liability-inspired Ruger M77 bolt actions.

All the M98s have a clip guide and hold five rounds. They feed from the magazine, so, naturally, you should not try to load six rounds. Five rounds and a stripper clip loading system are slow, and I have often wondered what would happen if the M98s had detachable box magazines. Had their magazines held 15 or 20 rounds and had they been truly designed to be replaced (unlike the magazines found on Lee Enfields), I wonder whether the semiautomatic weapons would have become so popular. Although the flush magazine looks sleek and was good on the drill field, the purpose of a combat rifle is not to look sleek. I suppose tradition perpetuated the in-stock five-shot magazine, as well as the budgetary concerns for the comparative cost of spare magazines versus stripper clip.

The M98 also has safety that is slow but certain. Turning the wing up halfway allows you to work the bolt but still prevents the weapon from firing. Flipping the safety all the way over locks the bolt, as well as keeping the weapon from firing, but you need to use your shooting (strong) hand to take it off. It cannot be merely flipped with a thumb to the off position, as you can with the Enfield Pattern 14 or 17. Placed in the middle position, you immediately see it standing in your vision like a flag. With a properly broken-in weapon, achieved by countless soldiers flipping the safety off or more likely your doing it in front of the TV at home, you can flip the safety off with your thumb. That way, you do not need to break your grip on the weapon. I would not trust that safety position with the rifle carried on my shoulder, where it could be brushed by vines, but in my hands, I could accept that carry. Flip it all the way over when you have it over your shoulder. I will admit, however, that merely leaving the bolt slightly open is as fast or faster and certainly as safe.

Recoil and blast are factors based on weight and muzzle length as well as caliber, rather than a design feature. The early M98s, such as the Gewehr 98 with its 29.1-inch barrel, are much more pleasant to shoot than the 17.91-inch barrel of the Persian Model 30/49 carbine. You burn more powder in the barrel rather than the air with the longer barrel, and you remove the blast further from your ears. If you have not shot a long-barreled rifle for a while, try one and I'm certain you will be pleasantly surprised. Recoil is obviously a function of weight and caliber. The heavier 8mm rifles are much nicer than the lighter ones. But as the saying goes, "They quit hurting when you quit shooting." The 7x57 is much more pleasant to shoot, of course, but the ammunition is not as powerful nor does it have as many different versions available.

All the M98 stocks have metal buttplates, which make them rugged and durable. Typically, the rifles have cleaning rods slung under the barrels, or they carry a jointed rod in the butt. The Gewehr 33/40, designed as it

was for mountain troops, is even better, and the metal plate goes up the butt quite a bit so that it could be used as a staff as the trooper climbed. Such metal buttplates naturally do not soak up recoil as rubber pads do but they will last long after rubber pads have perished. Most soldiers no doubt wear heavy uniforms while firing, unlike most of us who fire in shirt sleeves and—as noted earlier, "They quit hurting when you quit shooting."

Sling swivels are in a traditional setting, except that occasionally an extra swivel set exists to allow diagonal carrying across the back. They are not designed to permit an over-the-shoulder carry as we typically carry assault rifles today; soldiers were supposed to carry the M98s in their hands as a hunter does today.

Except for rare examples, the stocks on M98s are made of wood. Some wartime guns had laminated wood, which at the time people thought was cheap. Now we realize that they are actually better because of decreased warping. In either event, the stocks have a substantial wrist and are unlikely to break even when you strike someone over the head or fall off your horse.

An M98 rifle is a rugged and dependable piece of equipment. It may not be as fast as a Lee Enfield or Schmidt Rubin, and may not have as good a set of sights and safety as a Pattern 14/17 Enfield, but it still is a fine weapon. If you equip an M98 with good peep sight rear and blade front sight along with a detachable 20-shot magazine, you have a weapon that would make a fine combat rifle today. It will most likely be lighter and more accurate both intrinsically and practically than many modern battle rifles and quite a bit more powerful.

G33/40

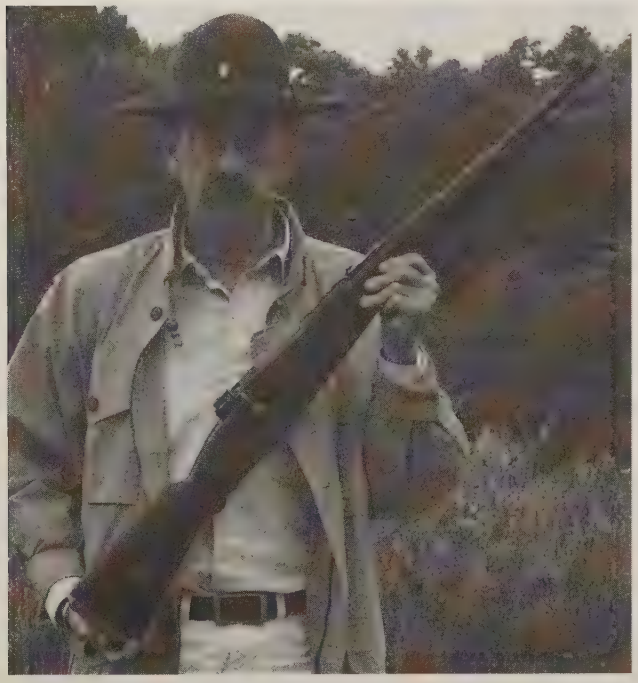
The G33/40 was nothing other than a standard prewar Czech design that the Germans reinforced by adding some metal around the buttstock to allow the mountain troopers to use it as a climbing aid. I find it

The German mountain troops used the stock of the G33/40 as a climbing stick. This photo shows the metal fitted to the heel of the stock to prevent the stock from being damaged.

rather curious myself that anyone would actually use his rifle stock as a climbing aid. I'd think that you'd run the risk of breaking the rifle stock, but perhaps my thinking is guided by my being raised in the flatlands of the midwestern United States. It simply would not occur to me to use my rifle in such a fashion. Maybe it is needed in the mountains.

The G33/40 lacks a butt trap but does have a cleaning rod slung under the barrel. This seems to me to be a serious deficiency in combat rifles, and I rather wonder why it is so commonly overlooked. Certainly the M14 and M16A1 were better rifles for having both cleaning rods and equipment immediately available. The rifle uses a smaller diameter receiver than the standard Mauser action and, for this reason, is slightly lighter. The barrel is also shorter and lighter in general. This all results in a much lighter and handier weapon than the standard K98 Mauser rifle, but , unfortunately, it does have the standard two-stage Mauser military trigger and awkward wing safety.

The sights are likewise standard Mauser: the front is the typical pyramid style, though well protected from accidental damage, and the rear ramp has a V-shaped notch. The



The G33/40 suffers from all the standard Mauser maladies—poor trigger, slow safety, and terrible sights—but it is handy and fairly lightweight and does give good power.

G33/40 is more sensibly sighted than normal, however, with graduations from 100 to 1,000 meters. Frankly, I think anything much over 500 meters is rather optimistic, but perhaps in the mountains, shooting across valleys from one mountain to the next it makes sense. I doubt it, however; a good peep sight would have been a lot better. In any event, as might be expected, the sights are difficult to see and slow to use on fast situations and in dim light.

Because of the rifle's lighter weight and shorter barrel length, recoil is heavier than usual for a K98, but only by about a 15-percent margin—certainly nothing a trained soldier would complain about. Offsetting the increased recoil is the fact that the shorter and lighter G 33/40 is much handier to use because it is well balanced and not so muzzle heavy as many Mauser rifles. In my experience, shooting from both the off-hand and kneeling positions seems to be improved when the mass of the weight is between the hands rather than at the front of the rifle.

Many people do not like G33/40 because of its greater blast and recoil, and it suffers from all the standard Mauser maladies: poor trigger, slow safety, and terrible sights. However, on the plus side, it is handy and fairly lightweight and does give good power. Plus, the sights, although not any better in visual appearance than those on any other Mauser 98 rifle, are graduated for a sensible set of distances at the lower end, at least, and the soldier is not forced to aim for the knees at all typical combat ranges. This is a substantial improvement, but it is unfortunate that the designers did not go a little further and put really usable sights on that would work in dim light or fast-developing situations.

MG 34

The MG 34 was one of the standard machine guns used by German forces in World War II. Even today, they are occasionally seen in Third World countries where supplies of 7.92x57mm ammunition are available.

This MG was designed to get around the provision in the Treaty of Versailles that prohibited Germany from manufacturing heavy machine guns. By providing a quickly removable barrel, the heavy water jacket could be avoided, and when used with a rather involved mount, good work at great distance could be obtained. In the flat areas of the Soviet Union, such machine guns were successfully used at ranges of 3,800 meters or 2.3 miles. Used in groups, frequently with different colored tracer ammunition, such weapons could be used to guide troops in the attack as well as deny the area covered to the enemy.

The gun weighs 26.5 pounds with the bipod attached, and many claim this is a "light machine gun." I find carrying a 26.5-pound weapon that measures 48 inches anything but light, but I suppose it is relative. If you compare it with a Maxim at 40.5 pounds, it starts looking light; whereas when compared with a 9-pound M98 Mauser rifle, it is heavy. I found this weapon difficult to fire because of its weight and poor balance (which is a result

The MG 34 was one of the standard machine guns used by German forces in World War II. The author poses with an MG 34 at John Ross' place in Illinois. He has an engraved .45 Commander on his hip.

of its length, its weight out front, and its open-bolt firing cycle). Firing it from a kneeling or bipod prone position is quite easy, however.

The cyclic rate on the tested gun ran a little over 900 rounds per minute, which I think is too high. The weapon starts recoiling, and you simply cannot hold it still. On the Lafayette tripod mount, however, it does not jump around nearly so much. Although the cyclic rate is higher than ideal, the gun does fire in a semiautomatic and full-auto mode. I imagine that German troops used this feature to lure enemy soldiers into the killing zone of an ambush and then went to full-auto fire when the targets were suitably defenseless, much like U.S. troops did with their Johnson M1941 LMG. A safety button exists above the trigger, and even though the safety seems well designed and effective, I really think the best policy is to trust the operator's brain rather than mechanical devices. Leave the bolt closed on an empty chamber until ready to shoot and then pull the bolt to the rear.

Belts on the MG 34 do not have the disintegrating link, as do the M60/M21 H&K or MAG. What this means is that you cannot simply load a very short "cheater" belt into your machine gun as you can with the M60 or MAG. As a result, the balance is altered somewhat, making the weapon even harder to carry in the field than it is unloaded. One good feature is the "can," which is designed to hold the cartridge in short belts and can be attached to the gun. These containers keep the belted ammunition much cleaner than it would be otherwise, but the cans rattle on patrol—which is to be expected when you fill up a metal can with metal links and brass or steel-cased ammunition. Belts can be linked together to make (theoretically) endless belts;

in static positions, 1,000 rounds linked together are not uncommon. Naturally, there is a limit to what the MG can pull up, so you will want to bring up the belts to the gun to avoid belt-pull failures.

As a squad automatic weapon, the MG 34 is not too successful because of its weight and cyclic rate. In that respect, it is as bad as the U.S. M60. At the platoon or company level, when used especially with the heavy tripod, it becomes quite effective. If manned by a proper three-man crew, replacing the barrels at 250-round intervals, you can keep a steady stream of projectiles raining down on an enemy position.

The German tripods are much more involved than the U.S. tripods. The German tripods allow for automatic traversing fire. This is a very nice feature when attacking a static area held by the enemy. The telescopic sight on the tripod also helps the shooter to use the MG 34 effectively by

German forces using the MG 34 in the field. The author was forced to used the M60 machine gun in the same way when the vegetation was too high for the bipod to be used. The author says that he has often thought how the ears of the Asian soldier he used as a rest must have suffered.

German troops used this MG 34 on an antiaircraft mount with drum feed in North Africa.

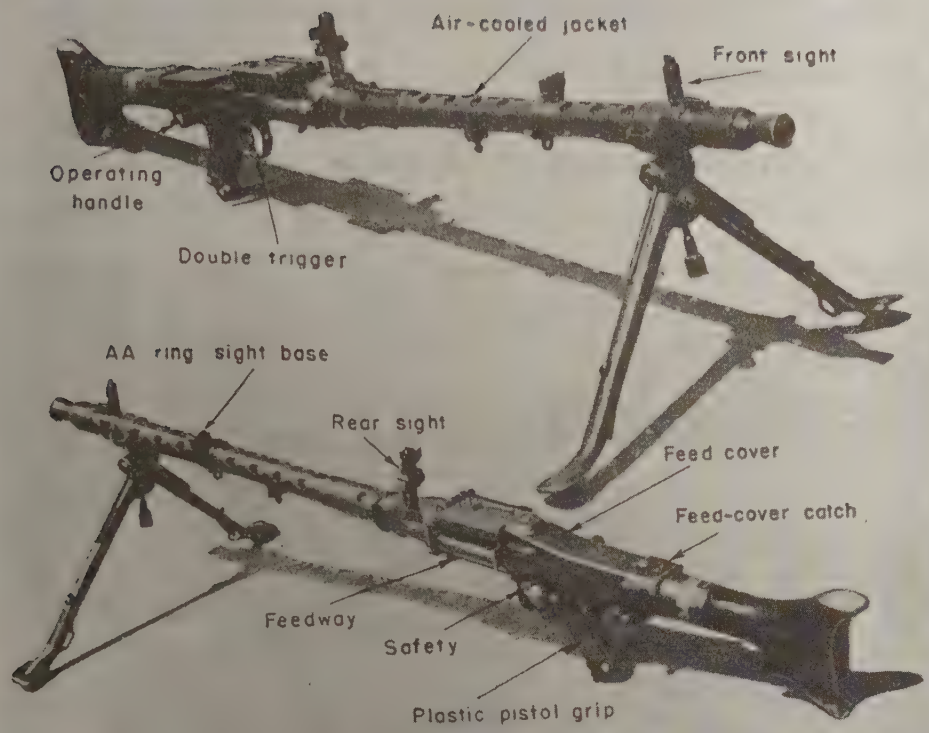
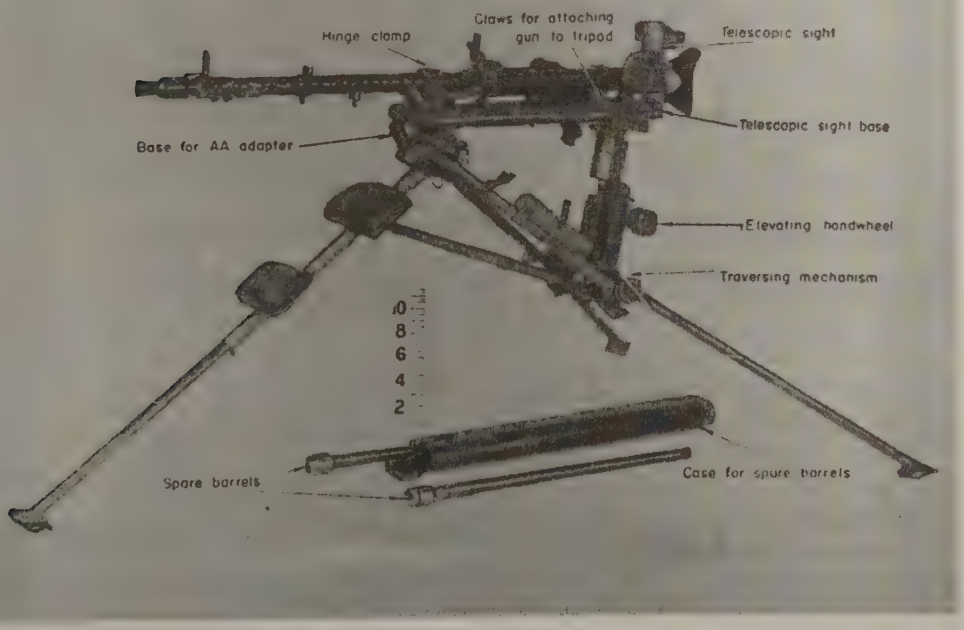


Figure 33.—Two views of M.G. 34 on bipod mount.



MG 34 parts and bipod and tripod mounts detailed.

firing over the head of his own troops. When used in such a role, the enemy positions can be attacked by a company while the company MG stays in the rear, firing with complete safety over the head of his own troops, lifting it only at the last moment as his troops enter the beaten zone. During World War II, German sources claimed that effective fire could be applied out to 3,800 meters with this machine gun and tripod combination. I see no reason to disbelieve this claim.

The ability to replace barrels on the MG 34 has always been one of its strong points. By adopting a quick-claim barrel, the Germans could substitute the MG 34 for the more traditional machine gun, which they were prohibited from making. Changing the barrel on an MG34, while no doubt much quicker than on a Maxim MG, is not as easy as changing one on an M249 or MAG. The lever is flipped, and then the whole action of the MG is turned on its side. The

barrel then will come loose, and gravity should cause it to fall out. If either gravity fails you or your actions are impeded by dirt or grime, you will need to fish into the barrel jacket and pull it out. Take care—it will be hot. Pull the barrel out, place it someplace to cool down where you will not roll into it, and shove the new one in. Close the action and resume firing. This represented a breakthrough in 1939, but the procedure is rather more involved than we would accept today.

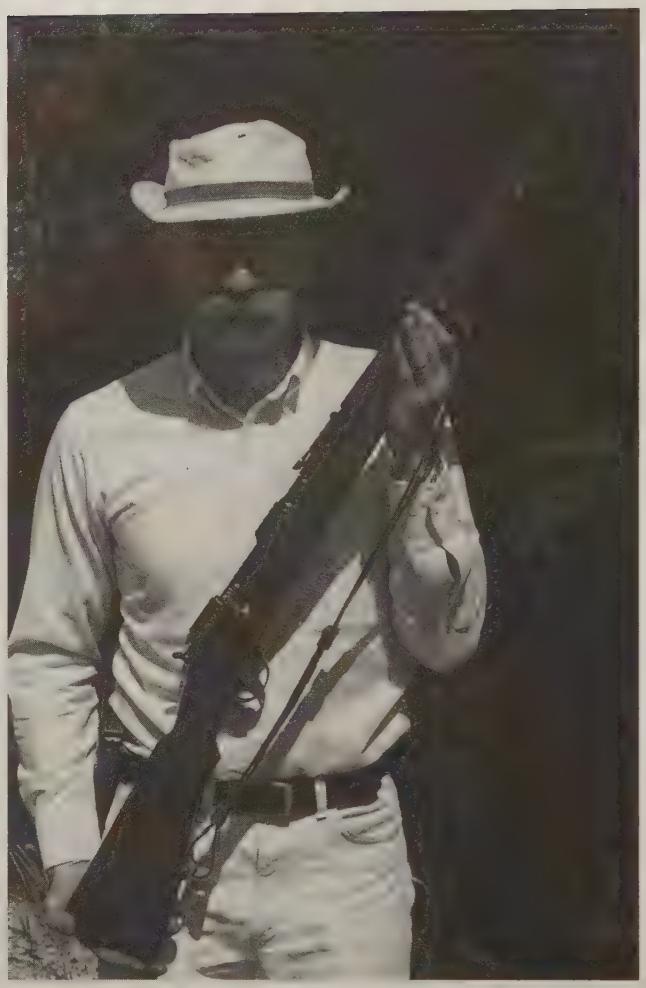
Before closing, allow me to tell you of a little experiment that I performed with an MG 34 mounted on a solid Lafayette-style tripod. For lack of a greater range, I placed a man-target at 100 yards, placed a 100-round belt in the weapon that had been firing flawlessly, and then fired one continuous burst at the target, basically to see if all the rounds would hit the target. The tripod was locked down as well as could be expected, although without sandbags in place. The 100-round burst resulted in 90 holes in the target. A machine gun is not a sniper rifle, but a failure to hit your targets completely upon demand merely wastes valuable resources.

Generally, about the worst anyone ever says about the MG 34 is that it is too expensive to make. This is no doubt true, but when you say that the only thing wrong with an MG that has been tested in the battlefields is that it costs too much to make, you are giving it a high compliment indeed.

GEW 98/40—8X57MM

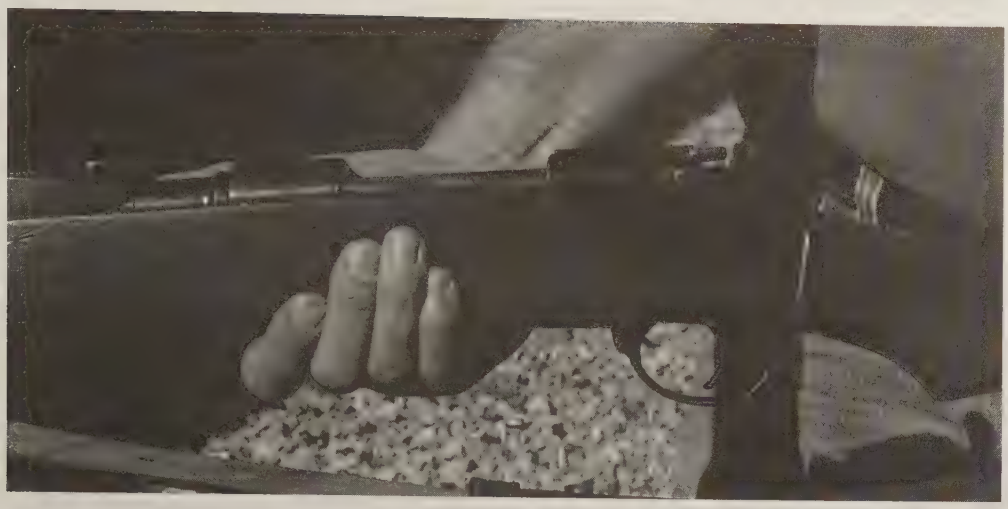
The GEW 98/40 is a German wartime modification of the 8x56R Hungarian M35 rifle. By changing the magazine to a double-column type and rechambering it for the rimless 8x57mm cartridge, the Germans took the available manufacturing capability and turned out weapons in a standard caliber, thereby avoiding ammunition complications.

This rifle uses the split-receiver Mannlicher-style of action coupled with the Lee Enfield-type of two-piece stocks. Many people do not like two-piece stocks, claiming



During World War II, the Germans modified the 8x56R Hungarian M35 rifle by changing the magazine to a double-column type and rechambering it for the rimless 8x57mm cartridge. The result was the GEWR 40 rifle.

that they result in inaccurate rifles. Others counter with the argument that you can use butts of different lengths to compensate for troops of varying heights (no doubt more important with the English and their far-flung empire than the Hungarians), that damages are easier to fix because only a part of a stock needs to be replaced, and, of course, the stock blanks to make the stocks don't have to be as large. This Hungarian design uses a two-piece stock, and because it is firm and rigid, I do not believe any inaccuracy could be attributed to it. All poor shooting was my fault, not the rifle's.



The sling swivel at the grip on the left side of the GEWR 40 interferes with the shooter's hand when he is shooting and can drive metal into his thumb.

The bolt handle on this rifle is half-round with the bottom half checkered. It is not particularly fast, and you tend to lift it with the heel of your hand then place your fingers around the knob to draw it to the rear. Accordingly, it is not as fast as the action on the standard Mauser bolt that, if done properly, is never grabbed by the fingers but always struck with the heel of the hand. And since the knob is in the middle of the receiver rather than at the end, as on typical Mausers, you must reach forward an extra inch and a half to grab it, thus slowing up the reloading process even more.

The sights are rather typical of the prewar European sights, with a pyramid front sight coupled with a small notch rear open sight. Unlike on many rifles, however, at least the sight elevations are reasonable to a degree: they are graduated from 100 to 2,000 meters. On many Mauser rifles (e.g., M96 Swedish, M95 Spanish Mauser), the lowest setting is 400 meters. This means you are high at all typical ranges. Apparently, the theory was that you aimed low at the enemy's knees at 100 yards, the groin at 200, the lower chest at 300, and the center at 400. Then you could adjust from there on out with the sights. Because I think that most people tend to put their sights where they want the bullet to strike and because most action takes place at close range, I am certain that many rounds were fired high because of these battle sights. Fortunately, on the GEW 98/40, you have a 100-meter setting. The front sight has a large front sight hood to keep the front sight shaded and avoid damaging it. When I fired the GEW 98/40 on a bright day, I had no trouble with the setup, but on a dark day or night, the combination of a heavy front sight hood and dark pyramid sight would no doubt make picking up the sight very difficult. The rear notch needs to be widened to allow quicker pickup and the front sight painted white if good, fast work is to be done in poor light situations.

The trigger pull is typical and certainly as good as that found on many factory rifles today. The safety is the standard wing Mauser type, which I find very slow. It is safe, but removing it to permit a rapid shot is so difficult I am certain that if I were to carry this rifle in the field I would ignore the safety and merely leave the bolt handle slightly up, closing it when I needed to shoot, as I typically do with Mauser-style rifles.

The rifle lacks any integral cleaning equipment, and the buttstock lacks a trap to hold cleaning supplies—a serious fault. The stock also feels surprisingly square in my nonshooting hand, which makes it less comfortable to hold than the typical military rifle with a rounded stock to fit the hand properly. The stock gets squarer the closer to the muzzle you get, and as long as you hold back at least 3 1/2 inches from the sling swivel, it is comfortable but not so as you get closer to the swivel band.

The accuracy I got was about what I

expect from similar battle rifles of the period. Many of them are very well made and, no doubt, accurate, but the sights are so difficult to use that it is a challenge to get consistently good results. The GEW 98/40 is not as fast to shoot as the Mauser M98 nor as strong, but it is certainly more than strong enough to handle normal ammunition. Had not the fixtures and machines already been set up to make the design, I am certain the Germans would not have developed the modification of the M35. But since it was available, they would have been foolish not to have made it and gotten it into the hands of their troops, who were fighting a war on two fronts.

MG 42

The demands of the war forced the Germans to abandon traditional concepts of machine gun design and manufacture. From the needs of the battlefield came the MG 42, which proved to be a very successful design. In fact, even today the design is essentially unchanged, except for the caliber (now 7.62x 51mm NATO), and called the MG 3.

Perhaps a few points make the MG 42 less desirable than the MAG, but it is still one of the top designs in the world and has been so for more than 50 years. Reliability is perhaps best illustrated by a test conducted by my friend Kent Lomont with a brand-new MG 3 made in Germany. Linking up belt after belt and using the gun off a Lafayette tripod, he fired a continuous 10,000-round burst! It took more than seven minutes! The barrel was getting white when he finally stopped, and the receiver itself was getting red in color. But despite this obvious abuse, no problems developed. He withdrew the barrel, threw it down, put in a fresh one, and fired a 1,000-round continuous burst. No problems. Any gun that can do that is certainly a weapon to be trusted.

Some older MG 42s will fire out of battery, especially when used with wartime ammunition of questionable quality. This can be avoided by making certain the springs in the roller locks on the bolt are strong. Watch this point because such a premature explosion can destroy your gun and send hot brass back into your eyes. It has happened more than once at recreational machine gun shoots.

Removing the barrel is fast and easier than on the MG 34 because you do not have to turn the weapon receiver, but I still do not think it is as fast as the MAG with its handle. I do not think you should have to place your fingers into a hot receiver to pull out a hotter barrel. A large wooden or plastic handle should be present to grab and pull the barrel away or to push it in with when inserting the barrel.

German troops fire the MG 42 LMG from a bipod. The MG 42 is one of the top designs in the world and has been so for more than 50 years.

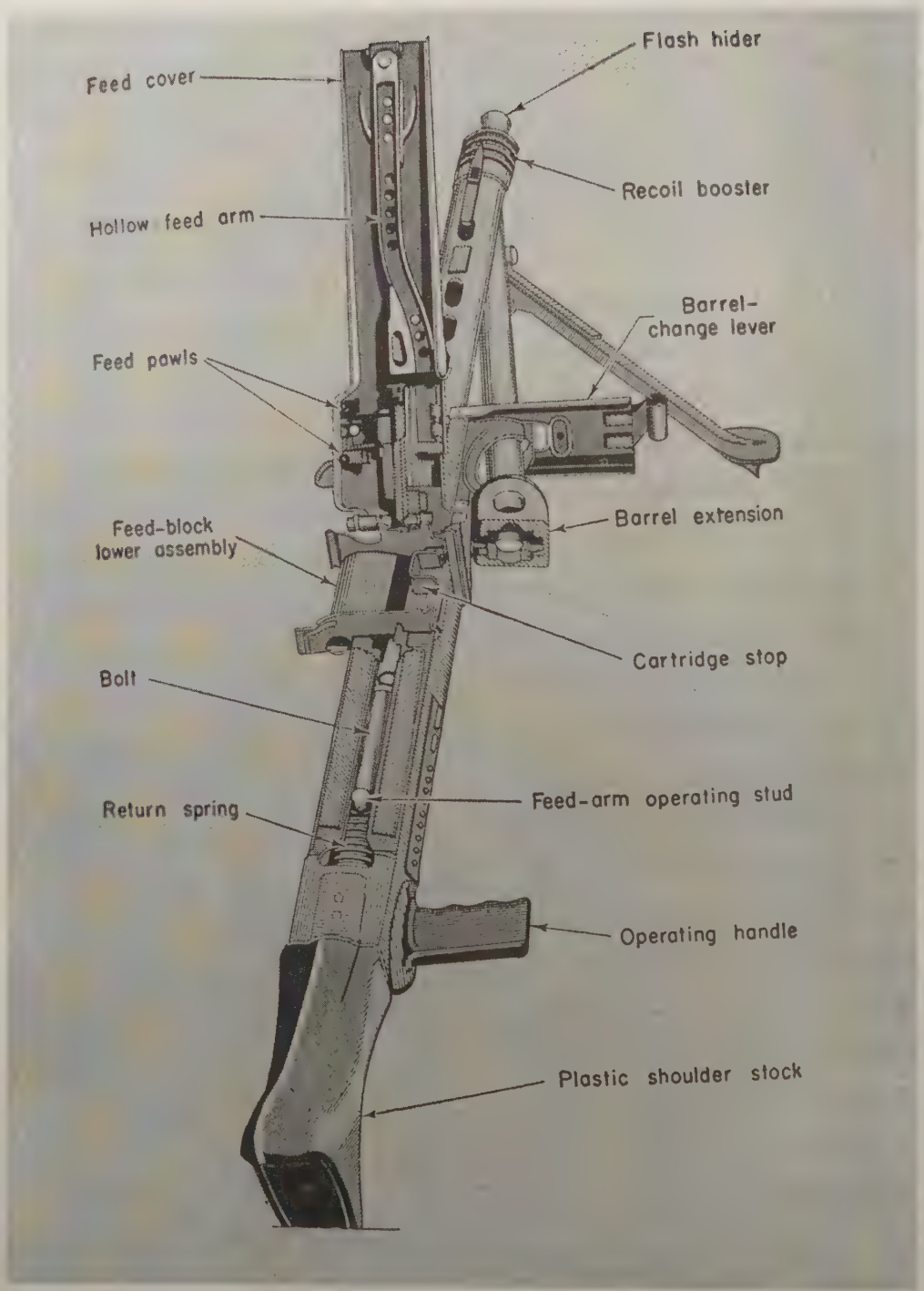
A German MG 42 machine gunner uses his ammunition carrier's shoulder as an improvised mount as he fires on U.S. troops advancing in southern Germany in 1945.

The other chronic problem with the MG 42 is its cyclic rates. Depending on the buffer and spring set installed, these weapons can fire up to 1,500 RPM. There is no provision for semifire as there is with the MG 34, and its cyclic rate is too high for single shots. Cyclic rates at the high end are too heavy for a ground machine gun unless it is used with the tripod. Even then, the weapon will use a lot of ammunition in a very short time when the high cyclic rate gun is used. Most guns you encounter will have the fast-rate springs installed. Although I do not know why, even a well-trained, skilled shooter has trouble limiting the shots to five at that rate in training. When actually firing in a real-life situation, this is more likely to be 8- to 10-shot bursts.

I have read that the German theory was to throw a shotgun-like burst of bullets out at the range at which the MG was firing and thus get the hits by virtue of saturating the area with bullets.

Perhaps, but it does not seem to work that way when you fire at targets. When I fire the MG 42, I have to work so hard to keep the gun from running away that I lose some of my concentration on the target area. The gun simply disappears in my view from rapid recoil. Given a high-rate MG 42 and an FN-D with slow fire at 300 RPM, I believe I can get more rounds on target with the FN-D than I could with the MG 42.

I have heard stories about the Germans wanting the high cyclic rate to deal with hordes of advancing Russians on the Eastern Front. Perhaps this was their theory, but it does not seem to actually work out when you start counting bullet holes in man-targets set up to test the theory. I am certain that the man who shot the gun and those around him felt like a lot was being done, but in my judgment "loud noises never killed anyone."



The operating features and parts of the MG 42.

When World War II was over, the new German army needed a machine gun, so it modified the MG 42 to shoot 7.62x51 mm NATO rounds and called it the MG 42/59. Later, the name was changed to MG 3, but it was the same gun throughout. Today, more than 50 years later, the gun is manufactured in German, Italy, and Turkey, just to name a few countries, and soldiers are going off to

The multistrand wire of the MG 42's bolt spring is an interesting feature. At the time, U.S. weapons designers did not use multistrand springs because of difficulties in determining their strength.

battle with a weapon that their grandfathers might have used or encountered. Such longevity in the field of crew-served weapons is almost unheard of today.

K43

This is the German version of the M1 Garand rifle. Why exactly the Germans made this rifle when they had the far-superior MP43 in 7.92x33mm available is a mystery to me. But I also should note that at least the Germans got it right and used a detached magazine, making it superior to the M1 Garand in that regard, in my opinion.

The first point I put down to the conflict between those who like long-range rifles and those who want rifles suitable for 300 meters or below. Apparently the MP 43 project was originally hidden from Hitler, who believed in full-power cartridges and opposed the development of the shorter-ranged 7.92x33 cartridge. Perhaps other ordnance people were similarly deceived. It always has seemed odd to me that the Germans would take the time and expense to build the K43 when the combat-superior MP 43 was available.

It is likewise an example of poor thinking that, although the weapon was designed to take a 10-shot detachable magazine, the Germans did not issue the weapon with multiple magazines but rather expected the soldier to reload by using stripper clips through the top—thus removing the biggest improvement the K43 had over the M1 Garand.

The K43 is as heavy as a Garand and is gas operated, and the recoil is accordingly lighter than the M98K. This no doubt endeared it to many German soldiers who happened to be issued it.

The trigger pull on the example tested was gritty and not very precise. Sights consisted of a front blade rather than the typical European pyramid, which made it easier to see than otherwise would be the case. The rear sight, however was U-shaped and shallow. Keeping the elevation proper with such a rear sight is very difficult for me, and I attribute the 6 1/2-inch group fired with iron sight to that rear sight. The same rifle with a scope shot a 3 1/2-inch group the same day with the same ammo, so the sights must take some of the

blame for the larger group. The front sight did have a nice hood on it to protect it from damage, which is a good idea.

The butt has a trap to hold cleaning gear, and a cleaning rod is slung under the barrel, always an excellent idea. The magazine catch is usable, but smaller than desirable if the magazine is really supposed to be used to reload the weapon. The fact that it is so small is another example of the fuzzy thinking that went into the design of this weapon. Had the catch been larger, perhaps issuing spare magazines would have been more common, or perhaps had the Germans issued the magazines, they would have made the catch easier to work—it's the classic chicken-or-the-egg problem.

The bolt handle is conveniently placed to allow the shooter to pull the bolt to the rear with the left hand, allowing him to hold the rifle by the pistol grip with the right hand. This is a good feature because it can be used with either hand, yet is canted enough to clear the scope when one is mounted. It has a dust cover that can be pushed forward to keep dust out, but that gets pushed back automatically when the first shot is fired. This is a handy feature, no doubt much appreciated in the rain or snow as well as in dusty or muddy conditions.

The K43 is the German version of the M1 Garand, but because it has detachable magazines, it is superior to the U.S. rifle.

The dust cover on the K43 slides back when the first shot is fired, which keeps dust, rain, snow, and mud out of the rifle's action.

The safety, located on the rear of the receiver, is slow to engage or (more critically) to disengage. Unlike the safety on the M98, you cannot simply leave the K43's safety off and close the bolt when ready to fire because the bolt will fully close when a round is chambered. This K43 safety tends to slow up your response to close-range targets and is clearly a drawback.

The stocks on all K43s that I have seen seem to be made out of laminated wood, which has proven to be very stable and durable. Although it may look like the Germans were scraping the bottom of the barrel when using such stocks, they

actually are very similar to the synthetic stocks of today in terms of resistance to warping.

The weapon is not particularly well balanced for off-hand shooting because the balance point is toward the back. That, coupled with the poor sights, make off-hand work at 10-inch plates at 200 yards difficult.

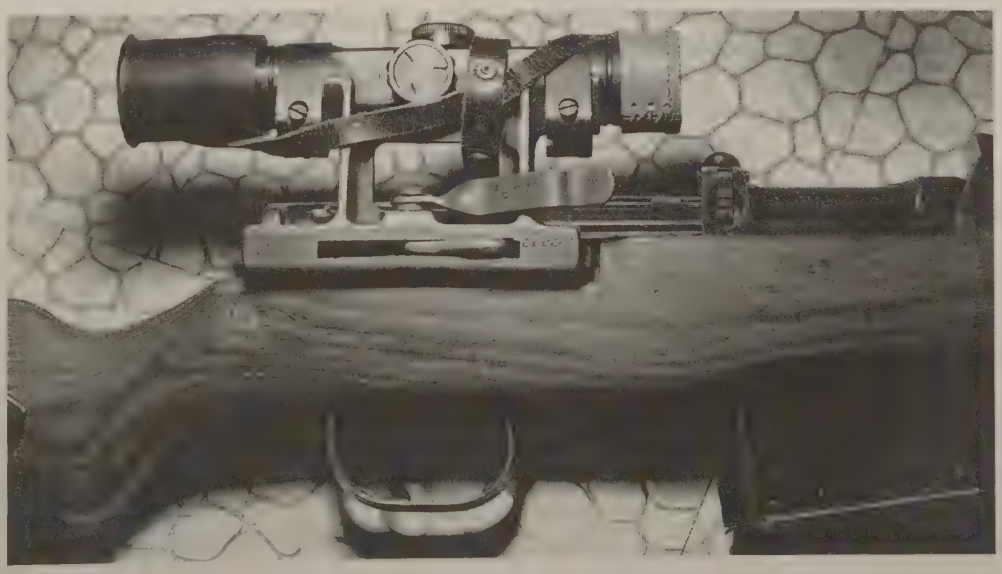
The K43 represents an odd dead-end for German service rifle development. It uses the standard rifle cartridge, which makes it powerful, yet the designers limited the weapon with poor sights. Had the Germans put a proper peep sight on the weapon, made the magazine catch bigger, issued spare magazines for reloading rather than stripper clips, put a better and more convenient safety on the weapon, and then armed the army with it in 1936 rather than depending on the M98, the German troops in the field would no doubt have performed much better. We are lucky that they did not do so.

K43 SNIPER

Apparently, the Germans did not have any program to select especially accurate K43 rifles for sniping purposes, but rather fitted all of them with sight rails to accept detachable low-power sniping scopes. How many were actually used as sniper rifles is unknown to me, but it would appear that no testing to select the most accurate examples was undertaken.

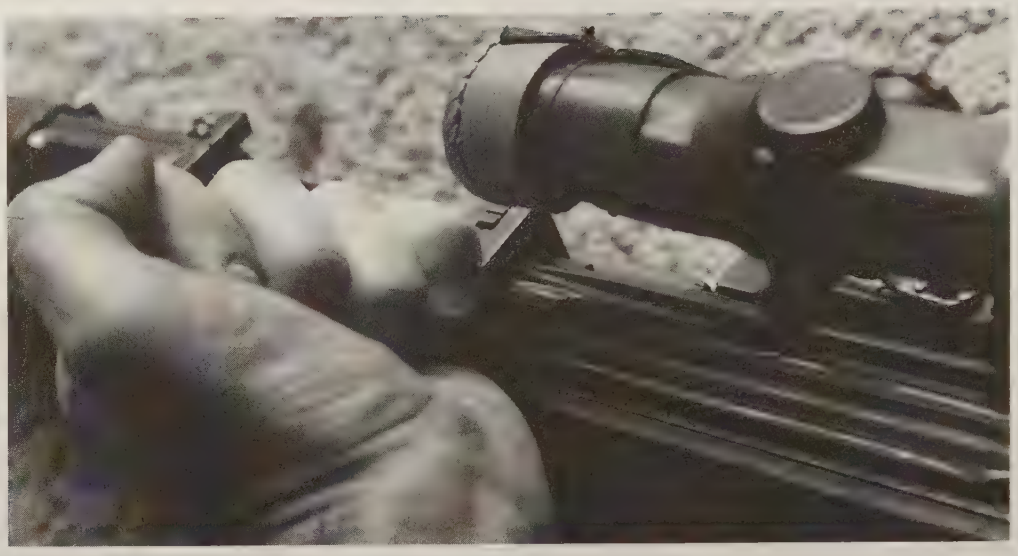
The rifle tested was fitted with a rapidly detachable scope, which was low in power. It had a typical (for German sniping rifles, that is) thick, pointed post center with two thick anti-cant lines. Such reticles always appear cluttered to me, although I generally like posts on hunting rifles. I was able to shoot a 3 1/2-inch group at 100 yards with the setup, which is not wonderful, but the trigger was very gritty with a lot of overtravel. I was able to get strikes on the 10-inch metal plate at 300 yards,

The K43 was not designed as a "sniper" rifle in the sense that the U.S. military uses sniper rifles for long-distance shots by specially trained personnel. Rather, the Germans simply outfitted K43s with detachable low-power sniping scopes and gave them to troops in the field to use at distances up to 400 meters.



Right-side view of the K43 sniper rifle shows the detachable scope mounting.

but then I did just as well with the same rifle using iron sights only. The iron sights remain on the K43, so if you have your scope damaged, you are not out of luck. That is better than such U.S. rifles as the Springfield M1903 and Remington M40, which have no iron sights fitted. With those rifles, a damaged scope completely puts you out of action. On the K43, you can use the iron sights even while the scope is fitted, but it is a slow proposition because of the clutter in the area.



The cocking handle on the K43 is angled to the left to permit the weak hand to cock the weapon while the strong hand maintains control over the weapon. This is an excellent feature.

The scope itself is low in power and rather dark. Optics have clearly improved in 50 years. The stock is short when the scope is used, but it is OK for use with iron sights. The comb is likewise low for use with the scope, and I had to raise my head so it floated in the air. Perhaps with winter clothes on, the problem would be lessened. I shot my example in mid-August while wearing a cotton shirt—and perhaps Germans had shorter arms 50 years ago.

The bolt handle is nicely angled to allow it to be drawn to the rear with the left hand, and because of the angle of the handle, the scope could be mounted fairly low. The safety is slow to disengage or engage without a scope being installed on the rear of the receiver. With the scope overhanging the receiver, it is even slower to operate—clearly, a defect. Although the K43 was really designed for stripper clip loading, that is not possible with the scope mounted; thus, the detachable magazine no doubt came in handy. With the M1 Garand, an offset scope has to be mounted, and that always leads to more difficulties in the end.

The scope is calibrated for ranges up to 800 meters, but given the limited accuracy of the rifle and its trigger pull, I rather doubt this weapon would be useful at that distance against man-targets. However, it could be useful at such a distance against area targets or objects such as vehicles or fixed positions, and the Germans had a lot of excellent ammunition, such as incendiary and armor-piercing rounds, that could be effectively used at such distances against area targets or objects.

I think the K43 sniper rifle was really designed to compete with the M40 Russian Tokarev sniper rifle. It was designed to allow a German soldier to engage individual targets at 400 meters with good accuracy, because of the scope sights, and to engage area targets at 800 yards. It was not supposed to be a true sniper's rifle in the mode that U.S. forces use sniper rifles—that is, 1,200- to 1,500-meter shots by specially trained personnel. Rather, the K43 sniper was intended to be fielded by a larger number of shooters who could use the accuracy and opportunities that typically exist on the battlefield to strike individual targets at 300 to 400 yards. In that capacity, the K43 was adequate for its task.

MP 43/4—7.92X33MM

There are few real breakthroughs in military weapons; the 7.92x33 cartridge, however, is one of them. Apparently, a committee working on World War I German ordnance first came up with the idea of a reduced-range cartridge that would be lighter than normal rifle rounds, yet still have adequate power for infantry encounters. However, with Germany pressed by the events of World War I, it is not surprising that the idea was not implemented. Then, in World War II, when it again became obvious that standard infantry cartridges were effective well beyond the ability of typical troops to use the power, yet something was needed with more power and range than a pistol-powered submachine gun could offer, the concept for a reduced-range yet still powerful cartridge was reexamined. From this developed the 7.92x33mm cartridge, which fired a spitizer 8mm bullet of 125 grains at 2,247 fps.

This cartridge was adapted to a number of German wartime guns but is most famous for its use in the MP 43/4 series of rifles, from which the term *assault rifle* was born. Despite what some members of Congress would have people believe, an assault rifle is a selective-fire weapon firing a cartridge that is lighter and less powerful than a conventional battle rifle cartridge and that fires from a closed bolt. It was Hitler himself who renamed the MP 43/4 the Assault Rifle 44 or Sturmgewehr 44. No doubt, he chose that term because it was catchy, for by that time the German army used the MP 43/4 mostly for defensive work.

The MP 43/4 had a tremendous impact upon the world even though it was only used for a brief period in Germany and in rare places after World War II (Syria comes to mind as a place where it was common before being replaced by the AK-47). Apparently, the MP 43/4 was very effective on the Russian front, and for that reason the Soviets designed their own 7.62x39mm cartridge as well as the rifle to shoot it, the AK-47.

The MP 43/4 is actually a little better designed than the AK-47. Unlike the AK-47, the German rifle's safety is convenient—at least to right-handed shooters—and can be removed without noise. The weapon can be left with the selector in semiauto and the safety fixed. Then simply flipping the safety off will allow the shooter to fire, which is much faster than the AK-47 system. The rate of fire is about 400 RPM, which is a third lower than the AK-47, and the ammunition has a lower recoil impulse. The slower rate of

A German SS trooper fires an MP 43/44 from the prone position. Note than he is using the magazine as a monopod support.

fire and lower recoil level combine to make the weapon much more controllable in semiautomatic and especially so in full-auto fire.

Although the MP 43/4 does have a selector to allow burst fire, the design of the weapon with the selector operation, as well as German manuals, makes it clear that the weapon is to be used as a semiautomatic carbine, if at all feasible.

Unlike the AK-47, the MP 43/4 lacks both a cleaning rod under the barrel and a cleaning kit in the stock. This is a serious drawback. Similarly, the front sight (which is a typical European pyramid) is unprotected on the MP 43. Later examples did have a sight cover. Even so, these pyramid-style front sights are hard to use accurately, especially when coupled with the V-notch rear sight blades. The rear sight is graduated from an intelligent 100 meters to an unrealistic 800

The test group fired by the author at 10 yards off-hand with two-shot bursts from the MP 43/44. The holes at the bottom middle of the target were made by the first rounds fired in the two-shot burst. The second shot in the bursts went higher and to the right as indicated on the target.

meters. The designers could have stopped at 400, I believe, and most likely no one would ever use even that distance in combat.

Recoil is quite mild, and the rifle is quite easy to fire in semiautomatic. On full automatic, the weapon is quite controllable because of the low recoil of the cartridge and weight of the weapon. Interestingly enough, when firing in semiautomatic, your finger must allow the trigger to go all the way forward after pulling the trigger, thus firing a shot. You cannot simply let the trigger go forward enough to catch the last sear engagement. Do that on an MP 43/4 and the weapon will not fire. You must let it go all the way forward and pull again through the double-pull system.

For some reason, the Germans saw fit to install metal handguards on the weapon. Testing on a day in the 90-degree range, I found that the rifle was too hot to hold after only 45 rounds. It takes about 90 rounds for the wood on an AK-47 to get warm enough to be uncomfortable to hold and about 200 rounds fired rapidly to get it to the point where it is too hot to hold. You can do the same thing with an MP 43/4 in 45 rounds. Perhaps in the cold climes of the Soviet Union this did not make a difference, but it certainly does in the "moderate Midwest."

The MP 43/4 is quite heavy at 10 pounds or more, but it does offer a number of excellent features not seen on any other German small arm of the period.

Because of the MP 43/4's weight and sights, I am not certain I would want to carry one into battle. Although not as futuristic looking, the 5 1/2-pound M1 carbine with its excellent sights and ability to throw a .30-caliber, 110-grain bullet at 1,850 fps is a better battle weapon in my opinion. I can carry it more easily, shoot it better, and—although it may not have as much power as the 7.92x33—by getting 25 yards closer, I even out the difference. The M1 carbine lacks a full automatic capability, but after reviewing lots of fully automatic shoulder weapons, I have concluded that a fast semiautomatic is the way to go if hits are what count, not rounds fired.

HECKLER & KOCH G3—7.62X51MM

When discussing the Heckler & Koch G3, it will probably be easier to give the good points and then proceed to the bad points because the former are so clearly outnumbered by the latter.

The H&K G3 is no doubt a very reliable weapon. Given the locking system and the absence of a gas system, it functions extremely well. Normally, we assume that the lack of a gas system will create problems as the weapon gets dirty or if the ammunition is underpowered. On the H&K G3, however, the weapon does not suffer from such problems, because the stronger the ammunition the stronger the roller-locking system will hold. And because it has no gas system, it does not clog from the gas and residue that are constantly flushed back into the rifle action as is common with so many gas-operated weapons.

It also appears to be an easy weapon to make with limited production facilities, and it is common to find manufacturing plants all around the world that make the weapon under licensing agreements with Heckler & Koch. Otherwise, it is unlikely that the weapons could be made in such technically backward areas as Mexico and Iran, where the weapon is still in production. Heavy stamping machines, ejection molding equipment, and some barrel-making equipment seem to be the only necessities. Good-quality fitters appear unnecessary.

I rather like the finish on the G3. It seems to hold up in hostile environments. It is certainly not a thing of beauty, but I like the rust-resistant nature of it and prefer the look to standard parkerizing found on U.S. weapons.

Having covered the G3's good points, we can proceed to the bad points. The first thing I always notice when firing a G3 is the recoil, which is much stiffer than that found

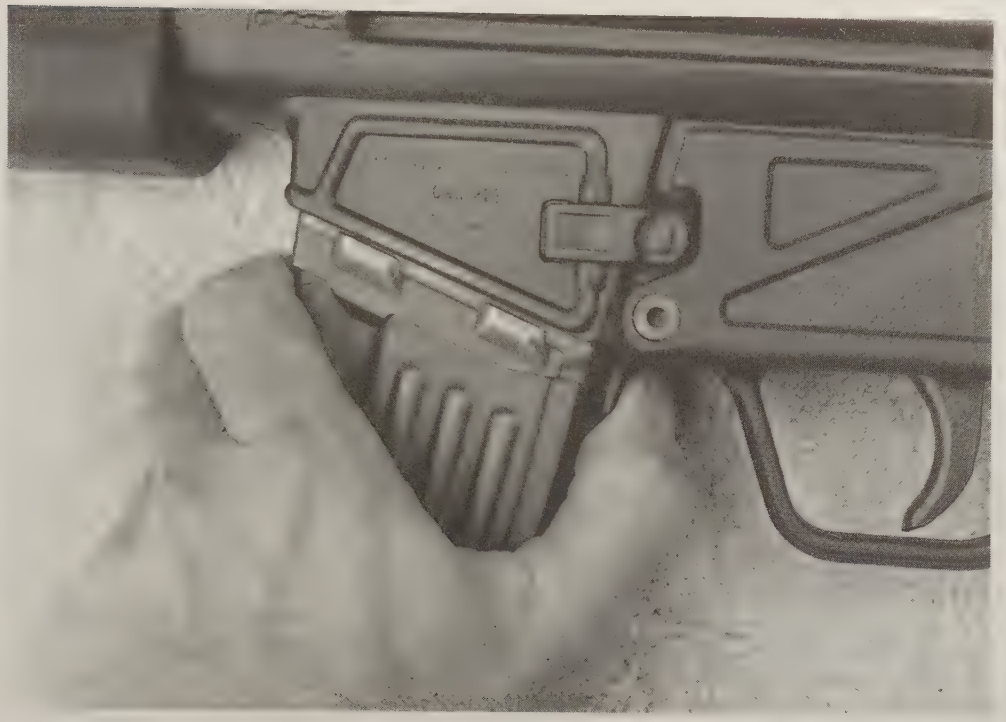
The Heckler & Koch G3 is a reliable firearm, but its flaws far outweigh its strong points.

A post-World War II German soldier firing a scope-sighted G3 rifle, but it is not really a sniper version.

in gas operated-weapons because of the G3's roller-lock mechanism. It seems very jerky to me rather than smooth. This feature is especially noticeable when firing in the full-auto mode, but it is also evident even in semiauto. The safety is also hard to disengage unless you shift the weapon in your hand or have thumbs like a gorilla. Many people weld extensions onto the safety to overcome the problem, but I think that is a design flaw that could be readily solved at the factory. The trigger system is, as might be expected, heavy and full of creep and slack. The weapon is designed to be loaded and thrown out of a helicopter at 300 feet onto a concrete pad or steel flight deck, and it will pass this test easily. However, those same features render the trigger pull difficult to use in the normal mode.

Balance in a firearm is hard to describe and varies for individuals, but most people who use the G3 will agree that it is ill balanced and does not feel "alive" in their hands like a good "game gun" will feel. Isn't it odd that we will take a weapon to hunt deer that feels "alive" in your hands, thereby adding quick-jump shooting skills, yet accept a clunky rifle to use in battle? Although a rifle's feel is somewhat subjective and opinions may vary, weight is very evident, and the G3 is simply too heavy. The G3 shoots a cartridge that is no better ballistically than the 8mm round used by German infantrymen in World War I, yet the rifle is heavier. There is certainly no big advance here!

The magazine release is acceptable but certainly nothing better than that found in a variety of other post-World War II combat rifles. However, the G3 will not tell you when it is empty. Everyone who has ever used a G3 will always tell you, if they are honest, that they have pulled the trigger on an empty chamber. This feature creates the major malfunction found in a G3—lack of ammunition. Many people attempt to avoid the problem by loading the last few rounds in a magazine with tracer. When they see red,



The magazine release on the H&K G3 has two options: button and flipper. The flipper-style release is especially convenient for use in cold weather or with the nonshooting hand as illustrated here on an HK 53, which is the same system as used on a G3.

they change magazines. This system obviously does not work for the sports shooter or law enforcement operative because the risk of a fire is too great. Having set the woods on fire once with tracer ammunition fired from a rifle, I am always very concerned about the issue now. I also have encountered difficulty in getting tracers to work all of the time. Perhaps I had old stock, and with current production ammunition, this would not be a problem. However, I do not think, even in a military context, that you would always want to use tracer ammunition because of the real risk of fire and the fact that the enemy may be able to follow the red line and then concentrate fire on your position. This lack of a magazine hold-open device is a serious design flaw that could be easily corrected, but the H&K designers merely state that because the German army did not want a hold-open device, they did not provide for one. Apparently, it never dawned on them that the German military hierarchy (the same guys who invaded Russia, held off invading England, and allowed Hitler to dictate military policy) might be wrong. I note that the FBI did manage to convince the Germans to make the MP 5 in 10mm with a hold-open device. It can be done.

To find the next flaw, we proceed to the hand guard. The hand guard comes in two types: the normal slimline one that is comfortable to the hand but overheats so badly if you fire four or five quick magazines that you cannot hold it , and the so-called tropical unit that is triangular in shape and much cooler to hold, but so big that it is difficult to hold securely even with my average size-9 hand—and even more so if your hand gets wet or you are wearing gloves. Cutting the slots that exist on the slimline forearm seems to help, but it is really not a solution when you fire a lot of rounds rapidly; it merely delays the condition by two or three magazines.

The flash hider seems to work in an acceptable fashion, but no better than similar units. Replacing it with a Bruce McArthur brake allows better recoil reduction, although not the flash reduction you get with the factory unit. It would be nice if you would get both recoil and flash reduction, as well as keeping the noise level down. Obviously, I am too hopeful.

Many people do not like the front sights on the G3, finding the ring around the front sight distracting. I do not find it distracting, but I

think the front blade is rather thick once you get out to 300 yards on man-sized targets because it tends to cover the target completely. The ring does shade the front sigh, making shooting in the dark more difficult than it could be—especially since the weapon does not come with night sights. On the flip side, the ring does result in a constant shade on the front sight, thereby avoiding glare.

The rear sight is not as good as it could be because it is tapered the wrong way so far as permitting sunlight into the eye. It appears to be rugged, but Jeff Cooper and others have noted that a Lyman 48 would be better. Also, I am unconvinced about the wisdom of readily adjustable sights on military rifles. Most soldiers do not know how to properly use the sights, nor do they know how to judge distance. Those who do, of course, benefit from adjustable sights, but those same people could probably do fine using a fixed unit and then adjusting by elevating the front sight. Many people in the military are heard to comment, especially in the less developed world, that by placing the sights higher you are shooting "harder." This is silly, but it is the reason you see the AK-47 rear sights cranked up to 800 meters in films from Yugoslavia! Even if the soldier shoots perfectly, given the trajectory of the ammunition, he will shoot over the target.

The mechanism for cocking or loading the weapon is awkward when compared with that found in many gas-operated guns. It takes a strong hand to pull it to the rear to chamber a round. This becomes especially critical when you remember that the weapon has no hold-open device, thus frequently leaving you prone, under fire, with an empty rifle. You must withdraw the empty magazine, insert a new one, and then pull the cocking lever back and chamber your weapon. Try it some time and see if you do not think there are better systems around. On such weapons as the H&K 21 LMG, I simply cannot do it from a prone position. I imagine that there are many soldiers who are tired, wounded, sick, or small in stature who may encounter the same difficulty with a standard G3.

The sling mountings (you cannot call them swivels because they do not swivel) are permanently mounted on the left side of the weapon. The G3 comes with a typical German-style sling that you have to be an engineer to use effectively. I always work on the theory that if it is hard for me, it is hard for everyone else, and the G3 sling is hard for me to use. Its design precludes it from being used as a shooter's sling, thus depriving the shooter of an easy way to improve his performance by 30 percent at a minimum. You cannot use it as an assault sling, either, because it is on the left side and the weapon keeps falling over rather than hanging straight down.

Last, we come to the buttstock. I stand 5'9" and weigh 150 pounds and have normal-length arms. In other words, I am average. The G3 buttstock seems short to me. It also is rigid and, if anything, adds to the felt recoil of the otherwise high-recoil weapon. It is also not shaped to allow quick mounting for those fast shots in the brush that occur at close range. Compare a G3 with a Winchester M94 and you will instantly see what I mean about feel of the stock for quick brush shooting.

The G3 is also encountered with a sliding buttstock assembly. As with all such metal stocks, the stock is uncomfortable to use. The metal struts hit your cheekbone in a most unpleasant fashion during recoil, and the rear buttplate also draws all the recoil into a very small area. When on the MP 5 in 9mm, such stocks are acceptable, but with the higher recoil of the 7.62 NATO round, they quickly lose their charm. Unless you have a critical need for a compact weapon, you would be much better off using the standard stock. I will say they seem to stay stable when extended and not rattle when closed—both features frequently missing with other folding-stock rifles—but it is still generally a very unpleasant rifle to shoot when a folding stock is used. As for shooting the weapon without extending the stock, that falls into the category of game playing rather than anything that makes sense tactically.

The grip on the G3 feels okay in my hand,

but it would not be so easy to use if I were left-handed, as are 11 percent of the general population. Firing the weapon from my weak side is always a challenge. Unfortunately, neither the buttstock nor the grip contains any cleaning supplies, as you would find with the AK-47, M14, or FN-FAL. If questioned about this serious failing, I assume that H&K would respond that "the German army did not specify it."

Although no doubt a reliable rifle, the G3 is simply too difficult to use effectively. By the time you develop the skills to be able to really get good performance from the rifle, you could have gone far beyond those levels with a better weapon. I always think it is a good weapon for your enemy to have because it is so difficult to use effectively, and many of the world's armies that have adopted it are unlikely to ever allow their troops enough time to master the weapon. Given a choice between a G3 and an M1917 Enfield .30-06, I would take the Enfield.

HECKLER & KOCH STG 1

The postwar German government, which was formed in the face of Soviet expansion in 1949, originally armed its military with U.S.-supplied M1 rifles. Quickly, however, the military adopted the FAL rifle. Soon, however, it selected another design, the G3, which was a modification of the CETME rifle that had been developed in Spain using late-World War II German technology. To conform to NATO requirements, this was adopted in 7.62x51mm NATO caliber. It is no doubt a very reliable design, but it is very hard rifle to shoot well because of its trigger design.

The Germans immediately saw a need for a sniper rifle because the senior officers in the new German army had been company- and field-grade officers during the war when they had faced Russian snipers. Faced with the same enemy, they naturally looked for a sniper rifle. The obvious choice would have been to select an M98 Mauser and rebarrel it to 7.62x51mm NATO—an easy job that would have resulted in a simple, cheap, and reliable weapon. One gets the feeling, however, that this was not "high tech" enough for the Germans, that they felt it beneath them to do such a simple thing. Contrast this philosophy with that of the British with their L42A1 rifle.

The designers at H&K were then forced to convert the G3 into a sniper rifle. The designers soon realized that the problem was going to be the trigger. In testing, the G3 was found to have good intrinsic accuracy. The barrels were well made. Testing various rifles that came off the line in a fixture allowed those rifles that tested best to be reserved for conversion to sniper mode. Frequently these rifles would shoot into 1/2 of an MOA, which is acceptable in anyone's book. But a sniper rifle is something more

The STG 1 sniper unit is the only H&K with a good trigger, in the author's opinion. However, the locking system still produces higher recoil levels.

The buttstock on the H&K sniper rifle is designed for a scope sight and offers a cheek rest that can be fitted to raise the line of sight to permit use of the scope.

than merely accurate. It must be *deliverable* accuracy.

A proper sniper rifle should employ a good telescopic sight. It does not need to have excessively high magnification since rifles used in the field are not fired from bench rests but prone or sitting positions generally. But the scope should gather light well to extend the shooting day. It should also be a rugged scope and mount combination because military rifles will be knocked around no matter how carefully the weapon is handled. The scope, if it is designed to come off, must be held in a mount that will allow the shooter not to lose his zero every time it is removed, because resighting a sniper rifle may not be practical. The scope should be secure against moisture and dust. The reticle should be useful under combat-style conditions when targets are dark and indistinct, and, if possible, some type of range estimation capability should be included into the scope's design.

Naturally, the Germans who have been making some of the world's finest optics for well over 100 years were capable of doing all of these things. The resulting scope was neither cheap nor light, but it was a very high-quality unit of rugged design. The Schmidt & Bender telescopic sight installed on the STG 1 has a variable power from 1.5X to 5X. A little higher magnification would have been desirable (such as the 9X the Leatherwood contains), and a low end of 3X is enough for close-range practical work. The scope includes a reticle that can be used for range estimation but lacks the ballistic cam device found on the Leatherwood unit. Any proper scope should, I believe, have such a unit or, even better, an integral laser distance gauge. As you go out in distance, a 50-yard error can cause a complete miss. People rarely are very good at estimating ranges at the further distances. A sniper rifle in 7.62x51mm NATO with proper ammunition should be capable of hitting a man-target at 800 meters easily and with good conditions up to 1,200 meters. But such shooting can only be done if proper range estimation is possible. The number of surveyors and prairie dog and sheep hunters in modern military units must have shrunk to a very small number by now; hence, technology must replace these skills. As a nation gets increasingly urbanized, such problems become greater.

The mount on the STG is a typical German-style claw mount. It is finely machined and of good design. It allows the shooter to take off the scope for storage or transit and yet returns to POA when reattached. Frankly, mounting it on a sheet metal (really a pressing, I know) receiver that must flex when fired and still accomplish this return to zero feature is a marvel of good engineering. It achieves this,

but with a high cost in price and weight. No such mount is ever cheap, nor does an all-steel mount of such size weigh little. Still it accomplishes its purpose.

To use the scope, the stock has a cheekpiece installed to elevate the shooter's eye. Unfortunately for me, it is still not high enough, yet it is too high to use the standard sights when the scope is removed. Due to the lack of height, I find my head basically hanging out there with no fixed point. This causes the zero to wander a bit. This could be overcome by having a high comb or at least some adjustment to suit the individual, as well as dealing with varying weather conditions.

As with the standard G3, no cleaning rod or cleaning supplies are included with the rifle. This is a serious deficiency, and makes maintenance in the field more difficult.

The forearm installed on the STG is typical, which I find uncomfortable to hold, but, admittedly, it does make for a cooler forearm. This perhaps is critical on the G3, which can be used to fire bursts (I really doubt it, but perhaps), but on a sniper rifle it seems out of place. The rounded slimline forearm would be better. The STG also comes with a bipod. A lot of people seem to like bipods because they make rifles very steady when firing prone. Unfortunately, they all shift the POI. If you plan on hitting anything with your sniper rifle that is either very small at close range or very far away, you had better stay away from the bipod. It will cause your bullets to hit differently. In fact, I would recommend taking it off and saving the weight.

Of course, the key to any accurate shooting is more the trigger than the barrel, and it is here that the H&K engineers have done the most work. After a lot of effort and at considerable expense, they managed to get a trigger on the STG that is almost as good as that found on the M14 rifle when set up to National Match standards. Unfortunately, it lacks take-up so you must be careful and only rest your finger on it when you are ready to fire. But it is a substantial improvement over the standard G3 trigger.

I do not think it is fair to compare the STG with an M40 Remington or any other truly dedicated sniper rifle. Instead, you should think of it as more the German version of the U.S.-made M21 sniper system. With this comparison, the German weapon comes out better, but it still falls far short because of the lack of a ballistically compensating scope or better range-estimating capability. For all that, it is an interesting display of Teutonic engineering skills and shows that with enough brains and money, you can take an item that was designed for one purpose and make it do things that are totally at the other end of the spectrum. The phrase that comes to mind is making silk purses out of sow's ears. A converted M98 Mauser would have yielded far better results, and the extra costs could have been used for practice ammunition.

HECKLER & KOCH 53

The H&K 53 is almost the same size as the famous MP 5 but fires the 5.56x45mm cartridge. As such, it is a much more powerful weapon than the MP 5 yet is only slightly heavier and longer.

The H&K 53 is derived from the H&K 33 series of rifles but has a shortened barrel. Because the H&K 33 itself was derived from the H&K G3 rifle, it has the same problems associated with sights and safety as its predecessor. Unlike the G3, however, the H&K 33 and hence the 53 are shorter and lighter to carry. As such, they balance better than the G3. Being chambered for a cartridge with less recoil than the 7.62x51mm, the 33 and 53 are much more pleasant to shoot.

Neither the H&K 33 nor 53, however, is really controllable in full-automatic fire except at very close ranges. The recoil and rate of fire are such that beyond 10 yards, the likelihood is great that the burst will carry off the target. I found that I could keep three-round bursts on a man-target at 10 yards but not beyond that; the third round would be going off target while the first two were hitting. Fast semiautomatic fire is the way to go with the H&K 53, but then

that is the way to go with almost any SMG, except at extremely close range, when actually hitting the target is critical.

All of my comments about the G3 are similar to the comments on the H&K 53 or H&K 33, except those noted as pertaining to recoil, weight, and balance, but the H&K 53 does offer a couple of very useful points worth considering if a short-barreled 5.56x45mm rifle is something you need. Just remember that most short-barreled 5.56x45mm rifles suffer from two problems: noise and functioning.

The first problem, noise, cannot be solved. You cannot get a quiet 5.56x45mm when you have only 8 to 12 inches of barrel. You can get less flash by loading ammunition with a faster burn rate and flash retardants, but you still got a big blast occurring close to your face. There is nothing to be done about it. This problem was so severe with the XM177E1/E2 rifles that the surgeon general of the United States was instrumental in getting the rifles removed from service because of muzzle blast and hearing loss complications.

More serious, however, is functioning. Rifles with very short barrels that use the 5.56x45mm cartridge frequently malfunction. When rifles use a gas system setup for 20-inch barrels, chopping the barrels to 8 to 12 inches is going to cause problems—as happened with the XM177E1/2, the AR-18s, and the numerous shortened M16 rifles one sees about. A virtual cottage industry has developed with the sole objective of getting such shortened weapons to function. All sorts of tricks, gimmicks, and witchcraft are used to get them to work 100 percent of the time. With the roller-lock system employed by H&K, you do not have such problems because there is no gas system. So, although the blast and flash problems remain (unless a proper powder is used), the functioning problem is eliminated. Thus for a short-barreled 5.56x45mm, the H&K 53 is probably the best choice. The sights are not great, but such weapons are used at shorter ranges than the G3. The safety is difficult to get off rapidly

The H&K 53 is derived from the H&K G3 rifle.

but is much better than that found in most SMGs. Safeties are generally very marginal at best.

When discussing such short-barreled weapons, the question of who really needs them frequently comes up. Obviously, for people who occupy cramped spaces, shorter weapons are quite nice. For instance, I have seen helicopter pilots using MP 5 K models with stocks as a weapon. They would be better of with an H&K 53 because it would use a cartridge compatible with what was available for infantry line troopers and give the shooter both greater range and penetration than a 9x19mm SMG offers. People who, in a military environment, would carry an SMG may very well find the 5.56x45mm short-barreled weapon a superior choice. Although in all honesty, unless a very cramped location is involved, they would do

Comparison of the H&K 53 submachine gun with 8.5-inch barrel and an AUG with a 16-inch barrel.

better with a standard-size rifle in the same caliber because it would be more powerful and easier to use. The advent of 7.62x39mm and 5.56x45mm rifles that are light and short yet offer a good rate of fire has really severely limited the military need for the SMG except in the silenced role.

It is in the police environment that the short-barreled 5.56x45mm weapon actually is useful. Police shooting encounters rarely exceed 150 yards, and most are much closer. The typical long-range need of the military is absent. In police situations, the officers are inside houses or other confined areas frequently; thus, a short, handy weapon is quite useful. In the military context, fighting in built-up areas is a rare situation to be dreaded. The police weapon needs to be powerful enough to stop aggressive foes who frequently are on drugs and increasingly wearing ballistic vests, yet it must not be so overpenetrating that it endangers innocent bystanders. The 9x19mm SMG has proven to be useful, but the 5.56x45mm short-barreled SMG is even better, as long as proper ammunition is used. In the military context, the SS109 ammunition was adopted to give greater range and penetration to the 5.56x45mm cartridge, yet for police work, this is exactly what is not needed. This can be achieved by going the opposite way by using 40-grain soft-nosed or hollow-point bullets. Such rounds will go faster, and they will not penetrate excessively since they shed their jackets when encountering resistant material. Yet because of the high velocity, they have good power levels and will penetrate soft body armor. Although the 5.56x45mm weapons do recoil more than the 9x19mm counterpart, the recoil is not excessive. When

used in the proper role of a self-loading carbine, they can be managed by police officers quite adequately. The H&K 53 is no heavier than the standard Uzi, Star Z-63, or similar open-bolt guns, and is very close to the H&K MP 5 in weight and length.

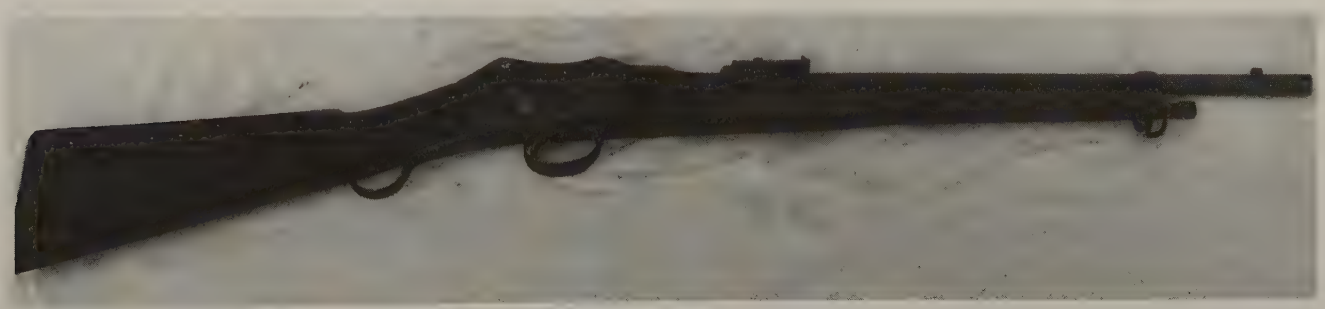
Unless a suppressed shoulder-fire weapon is needed, the police officer who needs a shoulder-fired single-projectile-firing weapon would probably do better with a short-barreled 5.56x45mm weapon with proper loads than a 9x19mm weapon. If you are going to a short-barreled 5.56x45mm weapon, the one to pick for the reasons of overall length and general reliability is the H&K 53. Just keep in mind that it is to be used as a semiauto carbine at anything other than extremely close range if hitting is your goal.

MARTINI HENRY

The Martini Henry rifle might well be thought of as the British army's version of the Trapdoor Springfield except, of course, that it has a stronger action. However, it was a single-shot rifle at a time when more-rapid-firing weapons were available. It also shot a cartridge that was deadly at ranges greater than the British infantry was ever likely to use it for. I have seen photos of British troops in India firing their Martini Henry rifles at 1,800 yards and have read of their tests at such extensive ranges as area or indirect-fire weapons, which had some legitimate use in a time before mortars and LMGs were widely available, but I rather doubt that the rifles in the hands of real infantrymen shooting at distinct targets ever got used beyond 400 yards.

The British Martini Henry rifles and carbines that one typically encounters are in either .450/.577 caliber or converted from that caliber to .303 British. Most of the later weapons were designed to be used by colonial native levies who were called upon to serve in World War I and did not really see much action campaigning. Even though the British may have been stretched for weapons, for real battles with real enemies like the Germans or Turks, the military found enough of the latest pattern SMLE rifles to arm all of its combat troops. Still the Martini Henry did carry on in all sorts of colonial scrapes and policing-type actions that can leave an individual just as dead as the most modern battle if his weapon lets him down.

The Martini Henry's most distinctive quality is its long lever, which is used to open the action. Upon the opening of the action, the empty cartridge case is flung out of the weapon, allowing the shooter to immediately reload. In a way, this is superior to the



The Martini Henry rifle was the British version of the Trapdoor Springfield. This well-made single-shot rifle has a long and storied history in the British and Imperial armies and is still used in scattered countries today.

Indian soldiers in pre-World War I era equipped with Martini Henry rifles.

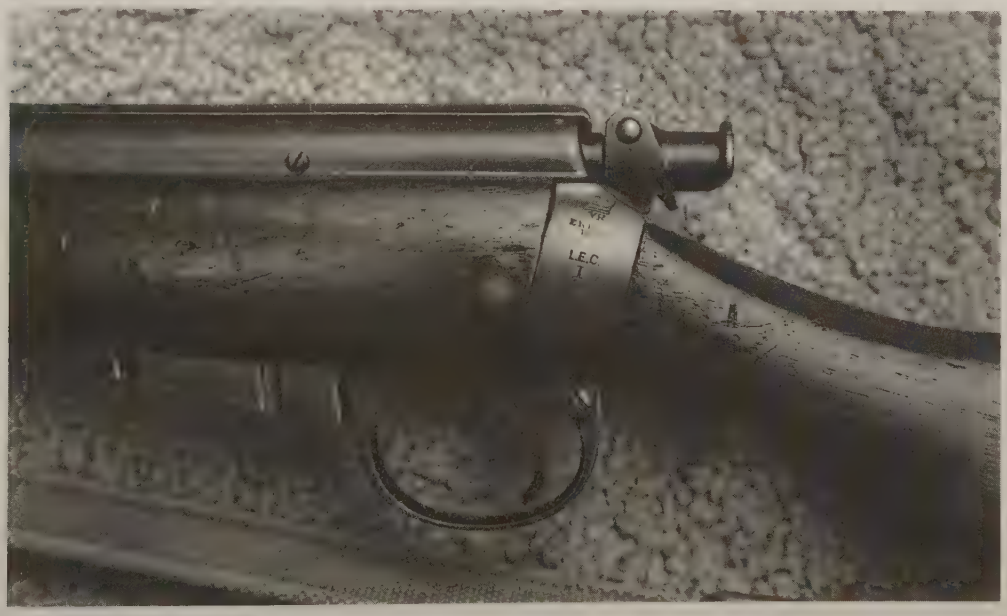
Trapdoor in that the shooter does not have to break his grip to empty the weapon. Still, the hand will have to be removed to load a new round so very little is actually accomplished. Ejection on all models seems positive, and the spring action could very well eject cases that might get stuck if the case had to be manually extracted, as occurs with the Springfield Trapdoor rifle. Additionally, the Martini Henry is automatically cocked when closed, so the hammer does not have to be cocked as occurs with the Springfield. This will speed up the process because it deletes a step in the process and also avoids slipping hands. Of course, it also means that a safety system is necessary because the shooter cannot simply look at the rifle to determine if it is ready to fire. Because of the shorter lock time with the Martini Henry, the trigger pull feels lighter, and the slamming of the heavy hammer is avoided.

Sights on the Martini Henry consist of a rather involved open rear sight that is hard to see and a pyramid angle front. The front needs to be painted white to allow quicker pickup in dim light or while in the field. Most rifles have cleaning rods that are handy both for cleaning as well as clearing stuck cases.

Rifles seem long to my eyes but are surprisingly well balanced because of the thin diameter of the barrel, whereas carbines are very handy and pleasant to carry. Of course, the carbines kick more and are louder, but as the old saying goes, "It quits hurting when you quit shooting." I prefer the carbine for field work, although I can certainly see that if I had to rely on bayonets to keep horsemen at bay or anticipated using my rifle as an indirect-fire weapon, the longer rifle would be preferred.

The Martini Henry served a long time in the British and Imperial armies, and I am certain that even today there are examples pulling military or quasi-military/police duties somewhere in the world. It has a reliable, well-made action that, despite limitations imposed by the sights, certainly did its intended job properly. Picking one up and shooting it makes you realize that you are not just shooting a weapon but are actually operating a time machine as you get

The Royal Irish Constabulary is a very famous formation, and the author expected much of its vaunted carbine. Unfortunately, he was disappointed in its performance.



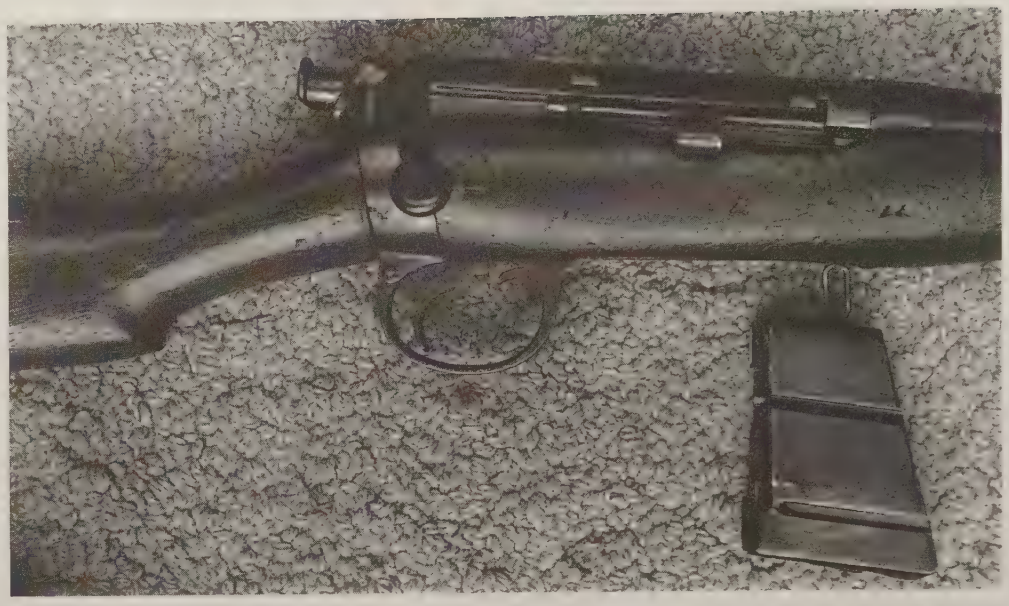
RIC carbines were made from earlier versions of the Lee Enfield system. The example shot was made in 1895. It was quite handy, although it suffered much greater recoil blast than a typical .303 rifle. The author questions the wisdom of equipping police forces with such a long-ranging weapon, given the typical Irish police functions, level of training, and skills—then and now.

transported (at least in your mind) to the Northwest Frontier in India in the 1870s. The journey is always pleasant.

ROYAL IRISH CONSTABULARY CARBINE .303

The Royal Irish Constabulary (RIC) was a quasi-military formation when this carbine was adopted in 1903. As a consequence, some of the features of this weapon make sense, whereas others seem less logical in light of current thinking. Since many of its patrols were mounted, the RIC wanted a carbine to be carried on horseback. RIC troops also patrolled both urban and rural areas, where much of the terrain is flat. Selecting the .303 cartridge made sense because it was the common military caliber and would be available from government sources. All RIC carbines are built on ex-military rifles, and the one tested, which had been issued in March 1904, was no different even though the receiver had been made in 1895.

The carbine has no clip-loading capability and uses a five-shot magazine that, interestingly enough, is chained to the weapon. Whether this was to keep the magazines from being lost or to avoid the officer carrying spares for his carbine, I do not know, but I rather imagine it was to avoid lost magazines. The weapon can be loaded through the open action with single cartridges, or the magazine can be removed and single cartridges inserted in it.



The RIC carbine is equipped with a five-shot magazine that is chained to the weapon to avoid loss. This would seem to be the worst of all arrangements to the author.

Although the capacity of the magazine is limited to five rounds, the carbine does have a cartridge cutoff that allows the officer to use the rifle as a single-loader holding the five shots in reserve. I imagine that the thinking was if the rifle were to be used in a riot, the officers would use it as a single-loader until the crowd got too close and then they would pull out the cutoff and rapidly fire the five rounds in the magazine that had been retained for an "emergency." Magazine cutoffs always seem to reflect fuzzy thinking to me.

The RIC carbine has a magazine cutoff that determines whether the gun can fire from the five-shot magazine or fire as a single-loader. In this photo, the cutoff is in the on position, which means that the magazine is "cut off" and the weapon will fire singly. British military authorities in 1903 thought this was awkward, and the author agrees.

The front sight is an unprotected pyramid front, and the rear sight is likewise unprotected. It consists of a V-notch rear graduated from 200 to 500 yards, and raising the leaf allows you to compensate for 600 to 2,000 yards. Exactly when the RIC thought it was likely to be shooting at law breakers at 2,000 yards (or even 500 yards) is a mystery to me. I rather imagine the people laying down the specifications were ex-military men who really did not consider the unique nature of law enforcement rifles. These sights were hard to see, and shooting suffered as a

consequence. Later, Enfield sights at least used a blade front and are easier to use even if not as good as the peep units that appeared with the No. 4 and No. 5 Enfields.

The safety is on the cocking piece. Whether it will function over a long period, I do not know. The fact that Enfield later modified the safety leads me to conclude that troubles developed with these safeties, but the one on the test example was convenient to use and quite certain and quick.

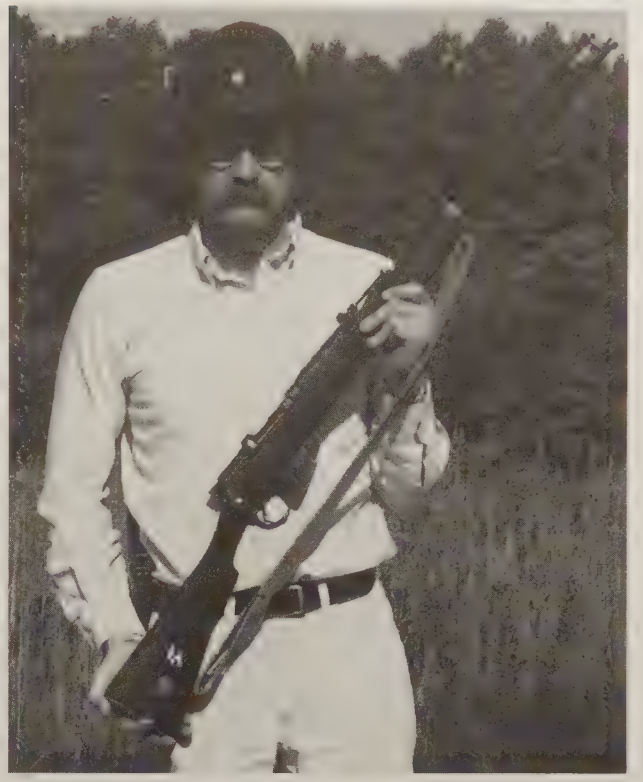
The stock on the carbine felt quite thin through the wrist, and the handguard was also quite light. It got hot after only a few rounds, and I understand it is prone to cracking. The thinness of the stock through the wrist prevented me from getting as good a grip on the weapon as I would have liked. The weapon was fairly light and short, and recoil and blast were substantial. Despite this general lightness, the carbine was muzzle heavy, which made shooting in both off-hand and kneeling positions less effective than it would have been had it balanced better.

The RIC is very famous, and I rather expected great things of its famous carbine. Unfortunately, I was disappointed. It is not nearly as handy as the No. 5 Enfield that came out 40 years later, and the RIC carbine's design flaws all point to the fact that the RIC obviously did very little real gunfighting over the years—had it done much, its weapons designers would have designed and adopted better equipment.

NO. 1 MK III ENFIELD .303

This rifle was the workhorse of British and Imperial forces in World War I and was used to a great extent in World War II. Although most people in the United States think of the No. 1 MK III as cheap rifles—remembering them from the "Ye Olde Hunter" ads in the early 1960s (I bought mine for $9.95 through the mail and still have it)—they are probably the finest bolt-action battle rifles ever made.

The No. 1 MK III has a 25-inch barrel, making it shorter than its European



The No. 1 MK III Enfield is probably the finest bolt-action battle rifle ever made.

contemporaries. Such a barrel made it handy and well balanced yet gave it good practical accuracy and power. It could be used in lieu of a short carbine, thereby saving a military from having to insert an additional weapon into its inventory.

The front sight is well protected by the massive wings on the front that give the No. 1 MK III its distinctive appearance. I find the front sight itself rather narrow, however, and difficult to pick up rapidly. A little dab of paint would help quite a bit in picking it up, and the size of the front sight does help make accurate shooting at long range possible. Remember, the British had just fought a war in South Africa prior to the No. 1 MK III's adoption, and there in the good light of the African plains many long-range rifle encounters had taken place. The sights in the Enfield go up to 2,200 yards, and with the side-mounted long-range unit, you can go farther. At the time, the British military

British forces in World War I cleared trenches with grenades and the No. 1 MK III rifle.

expected the rifles to be used at what we would view today as extremely long range and to be used in lieu of mortars or machine guns as indirect-fire weapons. Of course, much of that theory went by the boards with the experiences of World War I and the development of machine guns and other weapons that could be used by the infantry down to formations as low as the squad. With the arrival of those weapons that did the job better, the need for such long-range work with rifles alone went by the way. The rear sight of the No. 1 MK III is very well machined with enough subtle adjustments in it to please the most discriminating. Raised on peep sights and telescopic sights—as well as my being near-sighted—I must say that I have never liked the rear sight. I simply cannot see it well enough to use it fast. With plenty of time available, I can use it effectively, but I simply cannot see my sights well enough to satisfy me when fast work is necessary. Equipping the No. 1 MK III with a Parker-Hale adjustable peep unit makes it much easier to use.

It is the action that really makes this rifle, and the Enfield action is one of the smoothest and most reliable bolt-action rifle actions made. A Krag may be smoother, but no rifle action is more dependable than the Enfield. This was proven in the mud of France. It also can be fired rapidly, and because it has a capacity twice that of the German M98, it can stay in action longer. This was also proven in France.

The No. 1 MK III can be reloaded by stripper clips rapidly, or you can use extra box magazines. It was not designed to use spare boxes, the stripper clips being just as fast and lighter to carry, but I imagine more than one British Tommy had a couple of extra boxes handy to jam in his weapon when he wanted the quickest reload possible and wanted to keep the rounds chambered as he pointed his rifle at the Germans but still wanted to top up. No bolt-action rifle used in World War I or II can claim that feature except an Enfield.

Many people make much of the alleged weakness of the action, but in later years, the Indian government was able to modify the action using better steel to take the 7.62x51 NATO round, and the .303 round simply did not need more strength. Also such low-pressure loads were probably appreciated in tropical areas where the British tended to operate in those faraway days.

The stock is of two-piece design. Many people claim such designs are prone to inaccuracy, and perhaps they are, but you could not prove it by me. I have an Enfield that will shoot in 3/4 inch at 100 yards, and that is plenty good for a battle rifle in my judgment. The two-piece stock also allows the

Cutaway view of the No. 1 MK III (right side view top and left-side view above)

weapon to use different butt lengths to suit different-size soldiers. When you have an empire that stretches around the world, such things come in handy. During World War I, there were four stocks available for the No. 1 MK III: regular, long, short, and bantam. The buttplate has a trap, which I like because it allows you to store your cleaning gear. Unfortunately, the buttplates are made of brass or gun metal and are very slick. They tend to slip off my shoulder when I'm wearing cotton shirts. It does not seem to be a problem when I am wearing my buckskin shirt, so perhaps they would not with the woolen uniforms of World War I or II.

The trigger is the typical two-stage military pull unit that is not very crisp in many examples and is often heavy. It can be modified by people who want a much smoother and lighter trigger while still retaining the safety and durability of the two-stage unit.

The pistol grip of the stock is not full size, but it is adequate. Early No. 1 MK III rifles had long-range sights, but the later versions omitted it—not much of a loss. The forearm is well rounded and comfortable. The stock is made of wood, and the action cannot be removed from the stock for typical cleaning, but the fit is close enough to keep out most mud. There is no heat deflector in the stock, and the rifle barrel is quite thin compared with others. I have never fired my .303 Enfield long and fast enough to get the forearm so hot that I could not hold it. However, I have done so with a No. 4 Enfield rechambered to .308 (7.62x51mm NATO), so I imagine it would be possible—although the .303 is not as intense a cartridge.

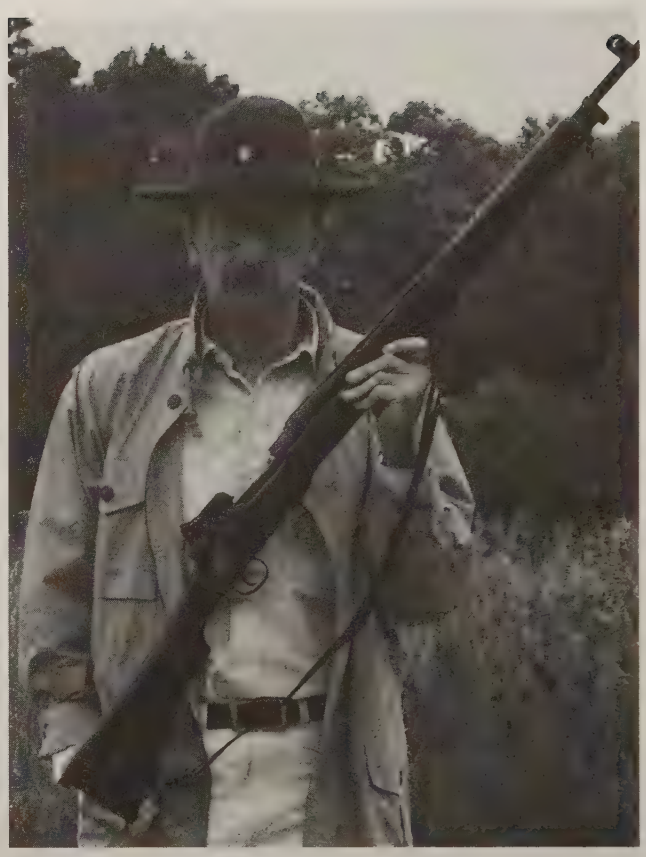
The sling swivel will strike the stock, making noise, so a little padding is in order for night patrols. The muzzle of the rifle is

protected by a rather heavy fitting that both protects the sight and the muzzle area of the stock and serves as a fitting for the long bayonet used with the No. 1 MK III. With the long bayonet, the No. 1 MK III makes quite the spear. Had I been a British Tommy, I would have preferred almost any pistol or revolver over the bayonet. I like my knives to fold in the middle and go in my pocket, and I prefer to use my handgun for fighting when my rifle malfunctions. I stabbed a guy with a rifle bayonet attached to my M14 rifle in 1968, and I am certain that the man is now approaching late middle age. Had I shot him with my Airweight Chief's Special instead, he would have been only a long-ago memory. For serious fighting, I will always take the handgun over the bayonet, but if you like the bayonet, the No. 1 MK III has a dandy fitting.

The British soldier who carried the No. 1 MK III had a great combat rifle. It was fast, reliable, fairly short, lightweight (all things considered), and held a lot of ammunition. We in the United States are spoiled by the easy availability of such rifles at low cost. When they were made in 1916, they cost the equivalent of $400 or more in today's money. The fitting and workmanship on them are better than what you are likely to find on any standard rifle leaving the factory today. If you can see the sights or are willing to change them to a peep, you will not go wrong to pack a No. 1 MK III along.

ENFIELD M1914/17

The British military adopted the Lee Enfield rifle in the 1880s, but by 1910 the troops realized that it was not as strong as desired. Developments were undertaken, and the Pattern 1913 was created. This was supposed to replace the Short Magazine Lee Enfield (SMLE), but World War I intervened. No matter how superior a design might seem or how much better the caliber, only the Italians would dream of changing rifle design and caliber in the middle of the war. However, it was an excellent design and was



The M1914/17 is an excellent combat rifle.

quickly rechambered to fire the .303 British cartridge. Many thousands were made for the British forces, who soon found that it was a very accurate rifle. Many were used as sniper rifles during both World War I and II.

When the United States got into the war, it soon found that the supply of M1903 Springfield rifles was not sufficient and that they were difficult rifles to manufacture rapidly in quantity. However, the Pattern 14 was available, and the action was long enough to accept the .30-06 cartridge. The weapons were quickly rechambered to that caliber, and production began. The only real difference between the rifles seems to be the lack of the long-range indirect-fire sights on the M1917. By the time the United States got into the war, everyone had pretty well figured out that such work was really the providence of the machine gun, the mortar, and the artillery piece.

Most people who are my age remember the M1914 and M1917 rifles selling through

The P14/M17 has served honorably all over the world, and the author believes that it may well be a better battle rifle than many currently in issue.

the mail for $19.95 to $29.95. The rifles were frequently in good shape, having seen little actual use except in training situations, although it is only fair to note that the M1917 was the main battle rifle of American Expeditionary Forces in World War I. Sergeant York won his fame in part because of his skill with an M1917. Although the rifles were in good shape, they typically were full of old grease, which meant when you brought one home you were exiled to the back yard by your mother (or wife depending on your age) where you would get a bucket of gas and clean the rifle. Still the weapons would ooze grease if left outside in the hot Missouri sun for years because the grease had penetrated into the wood pores. My first real rifle was an M1917 Enfield.

The bolt handle has a rather awkward dogleg appearance that many people find rather unappealing. But it is strong, and it allows you to pull dirty, muddy empties out and cram new rounds in. The action is longer than it needs to be for the .303 or .30-06 cartridge, but that length has made the rifle the darling of custom rifle makers who want to build a big-bore rifle. My friend John Ross had a .505 Wells made on an M1917 action that was manufactured when Kaiser Bill was in charge. Now more than 76 years later, it is still as dependable as the day it was made.

The rifle will hold six rounds in .30-06 plus another one in the chamber. That is always a nice feature, given the lower capacity of the M1903 Springfield. The trigger is a typical World War I-era two-stage pull. Years ago, I tested an M1917 converted with a bushing to .308 against an H&K M91 semiauto version of the G3. I found that I could hit a target at half again the distance with the M1917 than with the H&K. For instance, a target I could hit at 300 yards with the H&K I could hit at 450 yards with the M1917. The ammunition and shooter were the same; it was the sights and trigger that allowed me to do the work better with the M1917. It dawned on me that day that the doughboy of 1917 was actually better armed than the NATO trooper of 1980. How odd!

Of course, the M1917 shoots the .30-06 cartridge, which is superior to the .308. Using equal ammunition, the .30-06 will always strike a harder blow. Plates dented with .308 armor-piercing rounds are pierced with .30-06 ammo. The bolt action on the M1917 is not as smooth as that found on the SMLE or Krag, but it works, and the more practice you put in, the more rapidly it can be fired.

The stock is full-length except for a few inches of the barrel, which protrude. The barrel is 26 inches in length, which results in a weapon longer than the M1903 or SML, and many people think it overly long. The main European armies of the day used between 28 and 31 inches, so 26 inches did not seem out of line. Additionally, you get some velocity gain, a longer barrel on which to mount your bayonet, an increased sight radius, and a quieter rifle. Shooting rifles with barrels that go from 16 inches to 22 inches (as I do), when I shoot one of these longer-barrel rifles I am always pleasantly surprised by how much more quiet they are than their shorter cousins. True, they are longer, but somehow the M1914/17 has never felt unwieldy to me.

The sling swivels are well placed for use with the shooting sling. That little lightweight device will not only allow you to carry your rifle, but also improve your shooting by at least 30 percent if you know how to use it. I think they should be taped to avoid rattling during patrols however.

The rear sight shows the M1914/17's excellent peep unit typically used. To the left, the extended long-range peep that, coupled with adjustable front sight, allows 2,600-yard shooting. The author doubts that anyone ever employed such sights in World War I, much less killed anyone by using such sights.

But what really sets the M1914/17 rifles apart and makes them such fine battle rifles is the sighting system. On the front is a blade protected by thick wide wings that are open at the top and side to allow light to hit the blade. The blade is wide enough that it can be easily seen. Many front sights from that period are mere slivers that you must strain to see. It is the rear sight that really does the trick. It is protected from blows by two massive ears. Nothing will cause the rear sight to shift from a sideways blow. The sight is a peep unit with adjustables, allowing you to elevate the bullets to ranges that you have no business shooting. Unlike the sights on the

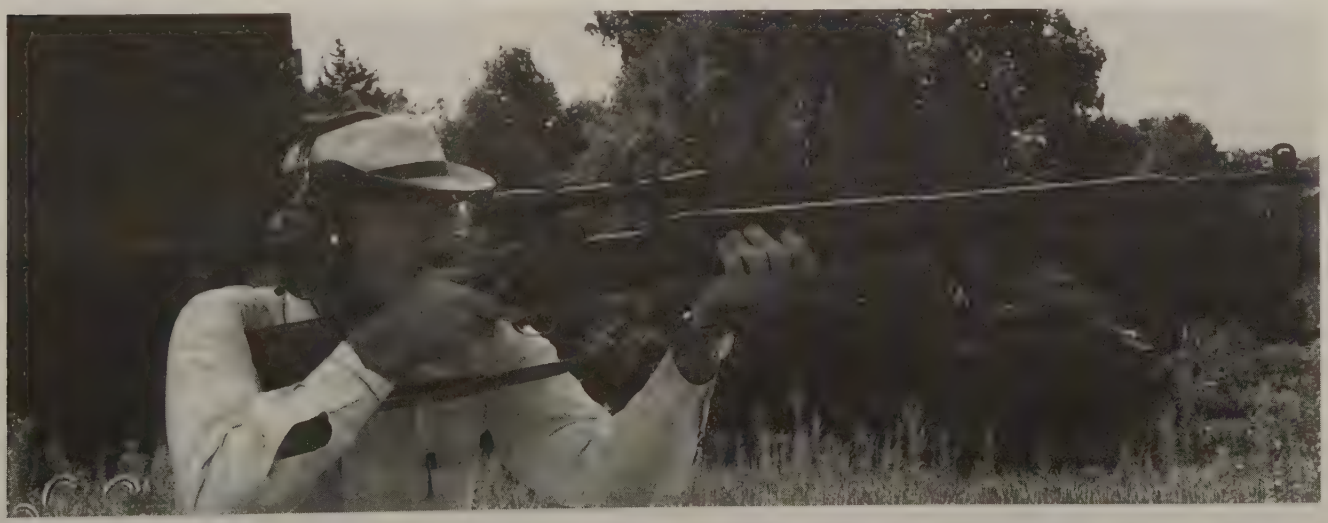
M1903 or SMLE, you can see the sights and really use them. None of that open sight or sliding rear here. Instead, the M1914/17 has an excellent, fully adjustable rear peep unit protected by a massive set of metal wings. The sights and trigger pull are the components that allow a good rifle to be shot accurately. I have never shot an M1917 that I could not get to shoot into 2 1/2 inches at 100 yards, and the first one I owned would shoot into 1 inch at that distance from a rest; 10 x 14 inch metal plates were generally hit every time out to 500 yards.

The M1914/17 is a good rifle that has served honorably all over the world. All of us should do so well as we approach eight decades of age. I think the M1914/17 may well be a better battle rifle than many issued today. Put on your old clothes, get some gasoline, and try out the next old greasy one you find. You may like it as much as I do.

P14 SNIPER

This was the rifle that (with proper training and, more critically, the proper spirit) allowed the British to seize the initiative in the sniper war during the 1914–1918 conflict. Early on, German snipers had held sway, and many British soldiers fell to their fire. But by 1916 the tables had been turned, and it was a rifle such as the one tested that allowed it to happen. Good equipment will never make up for bad troops, but good troops led by good officers with good equipment are really difficult to beat unless no political will exists to back them.

When testing many military weapons, two things quickly become apparent: (1) the soldier of World War I was no worse armed than many soldiers today and in fact might have been better armed when considering sniper rifles and (2) the development of optic technology can be easily seen. The field of view on the scope manufactured by the London Telescopic Sight Company in 1918 was narrow and the eye relief critical. That would not be terrible, but the darkness of the unit was. A good telescopic sight will help you see in conditions of darkness. A really good telescopic sight will frequently give the shooter an additional 45 minutes of shooting time at the end of the day. This is critical because it is at this time that both animals and enemy soldiers move about openly, and thus is the time when the most hits can be achieved. The scope mounted on the P14 was dark and did not gather light like a 1980s Leupold scope. At best, I think I would gain 15 minutes at each end of the day. Of course, in 1918 that was a real positive gain,

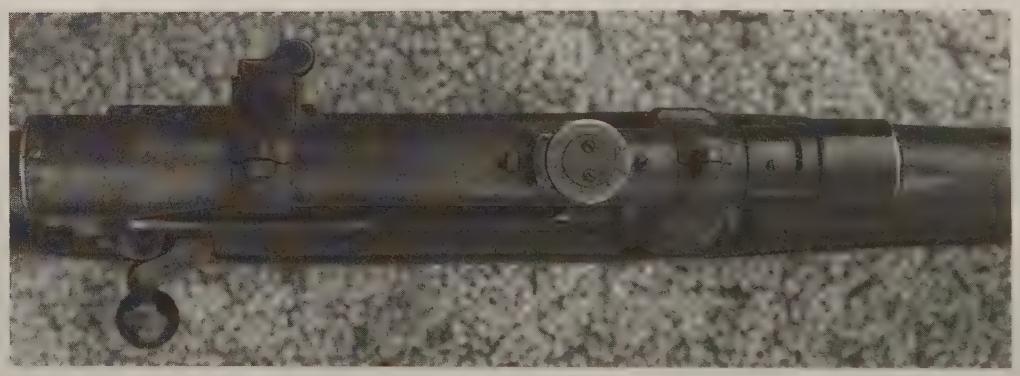


The author shoots the Pattern 1914 sniper rifle from the kneeling position. Note that the stock comb was too low and that now the author had to raise his head to look through the scope

but now it shows how much scopes have developed in 75 or so years.

The scope is mounted very high on the P14, which permits the shooter to use iron sights at the same time. Although I believe that all combat rifles should have iron sights even if they have a scope (with the possible exception of such weapons as the AUG and L85), the iron sights are strictly emergency rations, and the stock should really be designed to be used with the scope. On the weapon I tested, the scope was mounted so high that I was unable to put my cheek on the stock at all, but rather I had to raise it so much that only the top of my chin hit the stock. Of course, upon firing, the stock hit my chin a fair blow. This was most uncomfortable and not a good way to get the consistent location of your face on a stock necessary to make good groups. It also slowed target acquisition. Although I can appreciate the fact that the scope may go out on the World War I sniper rifle, I believe a lower mounting would have made it sturdier—and if the scope was not working, the shooter could take it off. The P14 sniper rifle tested did have a detachable mount, but I still do not understand why it was mounted so high.

A three-shot 100-yard group shot by the author with the Pattern 1914 "T" rifle. That's not too bad for a rifle and scope almost 80 years old the day this group was shot. The author does feel, however, that the scope is mounted too high. He had to crane his neck and therefore lost all stock weld when shooting the rifle. Lowering the scope would greatly facilitate shooting the rifle.



This top view of the telescopic sight shows the bullet drop compensation feature, which is graduated from 100 to 1,000 yards. This is an excellent feature and quite innovative, considering that the sight was made in 1918.

The P14 sniper rifle was standard in all aspects, except that apparently only Winchester-made models were selected for use as sniper rifles. The trigger was standard P14, as were the action and sights. As with all P14 rifles, a bolt hold-open exists, which is helpful on a combat rifle and something oddly missing from the German M98 GEWR.

When tested, the rifle grouped into 1 5/8 inch at 100 yards with Greek surplus ammunition. For an 80-year-old-plus rifle, I

thought it was quite adequate. I am certain that a half-inch could be cut off the group with proper ammunition. During World War I, snipers did not have select ammunition to use but would try different lots until they got a lot that was especially good, and then they would load up on it. A 1 5/8-inch group with standard military surplus ammunition shows this rifle perfectly capable of very good results.

The scope features a plain but very useful reticle consisting of a single cross hair to prevent canting and a post that always reminds me of the blade of a front sight. I found this reticle perfectly adequate to the tasks presented to me, and I prefer this type of reticle on my hunting rifles, so I suppose it was only normal that I would prefer it on a sniper rifle. Most sniper scopes you see have simply too much on them. A sniper has enough to worry about when shooting men and should not have to do all sorts of calculations based on reticle markings. The KISS (keep it simple, stupid) theory is usually well applied to all things and especially military weapons, in my opinion.

The P14 sniper rifle is rather long with its 26-inch barrel and heavy because it is based on the P14 rifle to begin with, but the whole thing is a fair sniper setup. The optics are not very good in light of today's standards, but radios in 1918 were not much in comparison with today's units either. The rifle, on the other hand, is certainly as good as many sniper rifles seen in today's armies. An L42A1, which is still used in the British army in the 1990s, with similar ammunition will shoot similar groups, and it is just as long and heavy. I do not think the P14 sniper rifle is a great 600-yard-plus yard rifle, but for 400 yards or less it could be deadly even today. Certainly, it allowed the British to turn the tables on the German snipers, thereby establishing beyond doubt that it was a good piece of equipment.

LEWIS LIGHT MACHINE GUN

The Lewis, one of the first successful LMGs, was developed by a U.S. citizen before

The Lewis light machine gun being carried on horseback by a U.S. soldier during the World War I era.

World War I began, but was not adopted by the U.S. military during the war. Instead the military used a series of other weapons that were neither as good nor as tactically flexible as the Lewis. Lewises were common in British units and also seen in other Continental armies during World War I and in the pre-1939 era. They were still being used in World War II as a rather limited standard item.

The Lewis was an air-cooled LMG in a day when water-cooled guns were common. It was a magazine weapon when belts were typically encountered. It was half the weight of a water-cooled gun and did not need a

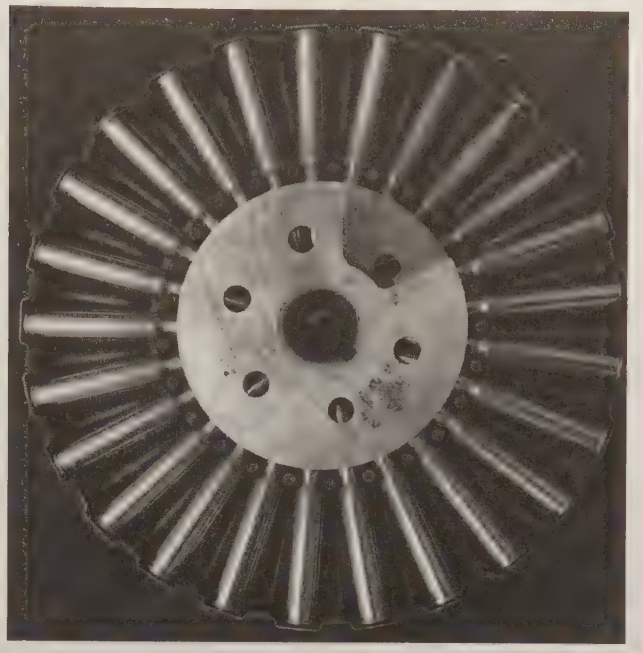
tripod to fire it effectively. To a person familiar with stamped weapons looking at a Lewis gun and its barrel shroud today, it would appear to be a light, handy weapon, especially when all the prior features are considered. Handling it proved to be something different. Rather than a lightweight metal shroud covering the barrel, it has a heavy, cylindrical piece of metal, making it muzzle heavy and rather awkward. It must have been as difficult to carry it through the muddy fields of France as it was for me to carry in Indiana, Missouri, or West Virginia.

The front sight is well protected and blade shaped, which is nice, but it should be painted white to allow rapid pickup in dim-light situations. The Lewis gun is designed to be fired in the prone position and to that end is equipped with an integral bipod. This bipod is also a well-machined heavy piece, which contributes to the weapon's muzzle

U.S. troops test the Lewis during World War I. The weapon is being fired upside down.

Dutch colonial troops in Java get ready for the attacking Japanese in 1942 with Lewis LMG and 158M95 rifles.

The Lewis light machine gun was designed by an American before World War I, but the U.S. military did not adopt it for official use in the war.



This view of the Lewis drum magazine shows how the drum is loaded.

heaviness. It also swings back and forth, loosely shifting the balance of the weapon adversely each time.

The weapon fires typically from a pan-shaped, 47-round magazine. Such pans are slow to reload, although admittedly this is not a real problem in a combat situation because they would be loaded in advance. Worse, they are heavy and awkward in size. They do allow a flat silhouette; permit a top-feeding system to be used, which is beneficial because gravity assists with feeding; and avoid the offset-sight problem encountered with such other top-fed weapons as the Bren and ZB26 LMG. More critical to a soldier, the pan avoids the problem associated with belts, which shrink in the weather and drag in the mud. However, it does have the drawback common to all pans: the metal case hits the metal pan, which causes a rattle that is easy to detect on patrol. I would imagine that not too many Lewis guns were carried into no-man's land on night patrol.

The rear sight is a quite involved peep unit that permits the weapon to be fired to very long range. Because it lacks a tripod, I doubt that the Lewis was ever used in such a fashion, but with enough sandbags on the legs, a good spotter, and a big enough target, 2,000-yard targets could be struck. Frankly, in my judgment, a bipod-mounted LMG was unlikely to be used at ranges more than 800 yards for anything really practical. It takes a tripod to use a machine gun at ranges more than 800 yards.

The Lewis gun fires from an open bolt and naturally suffers from all the drawbacks that configuration brings, so it clearly cannot be viewed as some type of rifle. Yet it also clearly added to the firepower of the British infantry section to which it was issued. Although the Enfield No. 1 MK III has a clip-loading feature, holds 10 shots, and is quick, it still can not deliver the constant firepower that a Lewis LMG is capable of delivering.

Lewis guns are commonly encountered today in the United States because so many of them that survived the war. Despite being heavy, awkward to handle, and of limited capacity, they did represent a valuable

addition to the infantry of World War I. Today, we can marvel at the fine machining that went into the Lewis, all done at a time of crisis, and the good material that still allows an 80-year-old-plus weapon to work without missing a beat. As well, we gain renewed respect for the "Tommy" who lumbered along with the weapon through the mud of World War I battlefields.

BREN GUN

Adopted originally in 1937, the Bren gun became a big success in World War II. Even today it is the box-magazine-fed LMG by which others are judged. Actually, it is rather amazing that the gun was adopted in the first place, much less worked so well. The design came from Czechoslovakia, and I find it interesting that the British were willing to accept a foreign design to begin with. Next, the weapon had been made for a rimless

A British Bren light machine gun position 100 yards from the Japanese lines in the China-Burma-India Theater, May 12, 1944.

A British Bren gunner sights his Mark I Bren at extreme range against German positions in North Africa during World War II (note sights).

The author with a Bren .303 LMG on an antiaircraft mount.

The sights on the Bren are offset onto the top-mounted magazine. The dust cover in front of the magazine can be pushed into place when the magazine is removed, and the barrel can be removed quickly by flipping the lever up. The weapon fires from open bolt and can be fired in semiautomatic. Cyclic rate is about 550 RPM; it is very controllable if somewhat heavy. The peep sight is excellent for practical work.

cartridge, but naturally the British shot a rimmed .303 cartridge. The magazine was changed to allow it to feed such cartridges, resulting in its unusual curved appearance. As long as the magazines are loaded with any reasonable care, the Bren gun will continue to fire as long as you care to feed it ammunition.

Many people are put off by the top-mounted magazine, but, in truth, the offset sights do not create any problem as long as you are right-handed. It does allow you to maintain a low profile when in the prone position. You should kick empties downward immediately, and when you fire a lot from one position, you sometimes have to push them aside but at least they do not fly into the brush, thereby disclosing your position to enemy mortar operators through their movement or reflections from the sun glinting off them. To change magazines in a fairly fast operation, merely reach up, push the latch inward, and rock the magazine back. Insert by catching the lip on the magazine under the correct spot and rocking the magazine toward the bolt plate.

The barrel is fairly heavy but, more important, has a good-sized handle

permanently affixed to it, allowing the shooter or his assistant to flap the barrel-locking lever up and to pull the barrel handle up and out. It is very quick out and very quick in. Although you may not have a belt LMG for continuity of fire, with a spare barrel at hand, you will have just as much ability as any other World War II LMG so far as barrel changing is concerned—and a lot better than most. Remember, the 1919 Brownings do not have a quick-detachable barrel, nor does the U.S. M1918 BAR.

The bipod, which is affixed to the gas system, is heavy but quite rugged and dependable. Bren guns also have a tripod available, but I doubt that many were ever actually used. When you get to the stage where you want a tripod gun, you want a belt-fed one. Of course, such tripods are fun to shoot off and allow you to do all sorts of stunts with a weapon, especially at night; you can set up the limit markers during the day, and by merely returning to these previously established limit stops, you can place your fire where you want it at night. I suppose that capability could prove comforting at night, but you can do the same thing for a longer period with a real belt-fed LMG.

The stock is nicely shaped and allows a fairly straight line to the recoil forces. The pistol grip angle is too straight for true comfort and actually bigger around than is comfortable for my average hands. The trigger guard should be bigger to allow gloved or mittened hands to work the trigger system.

The cyclic rate of the Bren runs about 450 RPM, which is really quite nice for allowing highly controllable bursts to be fired. It can easily be used to fire single shots even when set for burst, but, of course, it has single-shot capability. That is a nice feature; I can envision a situation when you would not want the enemy to know you have an LMG available until they press their attack past the point of no return. As a more practical point, it is also nice for sighting-in purposes and shooting on the ranch or farm when you do not want your neighbors to know you are shooting machine guns. The cocking lever is located on the right, making it difficult for the left-handed shooter—but such people are not likely to be Bren gunners, anyway, because they will not be able to see the sights. Cocking pressure is actually surprisingly light.

The weapon is long and heavy. I find it somewhat ill balanced and not very pleasant to carry on long walks because there is really no good way to carry it ready to fire. There is no forearm to hold on to, and in winter the metal is cold to your hand—and, of course, hot in summer. After a couple of miles, I usually am staggering along whenever I take a walk with a Bren. No serious person would ever carry it by the handle on the barrel because it is too slow to get into operation. I also do not like to carry open-bolt firing guns such as the Bren with the bolt back and safety on. I prefer to simply cock it when ready to fire. Because of its weight, I cannot hold the Bren off-hand and shoot it more than one or two shots. After that, the weapon begins to drop.

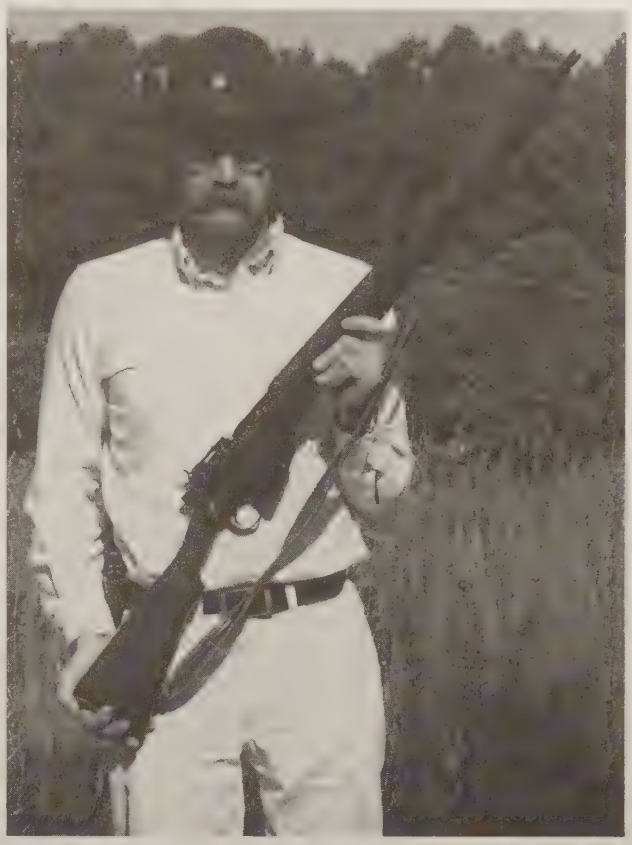
I am never completely happy about any weapon that requires the prone position since I have found that rarely is the grass short enough for me to see over in the field. I once tried to get an M60 in operation and found that when I went prone I could not see anything. I ended up shooting it off a rest provided by another soldier's shoulder.

After determining that I could not shoot the Bren off-hand in the prone position effectively, I tried to find another way to shoot it. After much experimenting, I determined that the best way to shoot it (assuming no rest was available) was to go to the kneeling position. There I have enough strength to hold the Bren up and in position long enough to fire a magazine. I also could get hits in that position on 10 x 14-inch plates at 300 yards. That was satisfactory to me.

German forces used the Czech examples of the Bren gun in 8mm with equal success, and the guns were made in Canada during World War II for both British and Commonwealth forces in .303 and for the

Chinese in 7.97x57mm. Many of these Chinese guns were later converted to 7.62x39mm. After taking the .303 Bren out of the supply chain, the British discovered that the belt-fed GPMG (the MAG 58)—although an excellent machine gun—simply could not be used as an effective squad automatic. Unlike the U.S. Army, the British army had an easy solution: they rechambered the Bren to 7.62x51mm. Such weapons were found to be excellent in every way, perhaps even better than the .303 model from which it sprang because of the .303's magazine malfunction problems.

The fact that the Bren is rather ill balanced and too heavy is of only minor significance once the bullets start to fly. But as all true infantrymen say: the lighter the better, as long as control, accuracy, and reliability are not sacrificed. I would take the louder noise and greater recoil, even less effective range, if I could get the same accuracy out to 800 meters and the designers could get the weapon down to 12 pounds, make it balance like a "game gun," and keep it short.



The No. 4 Enfield rifle was designed to replace the No. 1 MK III.

NO. 4 ENFIELD .303/.308

In the mid-1920s, the British began looking for a replacement for the No. 1 MK III rifle. That rifle had served with distinction during World War I, but it was an expensive weapon to make in terms of machine time, manpower, and materials. These things are always in short supply during a war, and it appears that no matter how much you plan, no matter how many rifles you stockpile, you will never have enough when the crisis develops. After considerable experimentation, the British unveiled the No. 4 rifle, which used the standard Enfield action that had proven so successful during the war but incorporated a number of changes to facilitate mass production during wartime.

The butt of the rifle is the same pattern as the No. 1 MK III and also has a smooth metal buttplate with trap for cleaning equipment. As with the earlier Enfield pattern, it likewise slips from the shoulder when rapid work is undertaken.

The trigger system is the same, at least in feel, with a typical two-stage military take-up. Pulls on match rifles can be smooth, but they are not light. The magazine system is the same although the actual magazines are not interchangeable. As before, the soldier was supposed to load the weapon with stripper clips, not spare magazines. Capacity is 10 shots, as before.

Designers made a major improvement, however, with the sights. Instead of the open sight, the No. 4 has an adjustable peep, at least on the early models. The final rush of war production saw this reduced to a simple L-shaped peep flip sight that lacked the fine adjustments of the early models, but if "on" for some reason, it would be just as good for practical purposes because the more involved earlier pattern peep is not any better except

for target shooting. The problem is that the late pattern is rarely "on" properly. I like the sights on the No. 4 much better than the open sights on the No. 1 MK III. In fact, I think it was the target shooter's efforts in developing peep sights to fit the No. 1 MK III (such as the units sold by the A.J. Parker Company) that caused the military to develop the standard peep sight and use it on the No. 4. The front sight is mounted on the barrel in a heavy barrel band sight protection unit. It is slightly back from the end of the barrel as the last few inches of the barrel protrude from the wood, giving the weapon a different look from the old SMLE.

British soldiers in World War II armed with the No. 4 Enfield .303 and the Thompson M1928 submachine gun.

The stock is a broad, two-piece affair. I have never heard of buttstocks available in different lengths for the No. 4 as they were for the No. 1 MK III, but perhaps they are available. The forearms have no heat deflector in them, but the barrels on the No. 4 are heavier than those on the No. 1 MK III and it is very difficult to shoot the rifle long enough and fast enough to get the stock so warm that if uncomfortable. Sling swivels as on the early model are standard for a rifle and need to be taped if carried on patrol, especially at night.

The No. 4 always looks longer to my eyes than the No. 1 MK III, but that is an illusion. It is slightly heavier because of the barrel weight. The safeties on both rifles are quite handy, especially in contrast to other European bolt-action rifles. I have never found the No. 4 to be as well balanced as the No. 1 MK III and would like the barrel to be shorter.

After the war ended in 1945, Britain had vast stocks of No. 4 rifles that were basically obsolete in the eyes of many. Once NATO adopted the 7.62x51mm, some bright soul discovered that since the No. 4 action was stronger than the No. 1 MK III, the rifles could be rebarreled to 7.62x51mm NATO. Then the rifles could be held in reserve stock and used for territorial units. An expensive program was undertaken to develop kits to allow this modification. Naturally, there were Commonwealth countries that had stocks of No. 4 rifles that might be interested in such a conversion. Both Sterling and Enfield

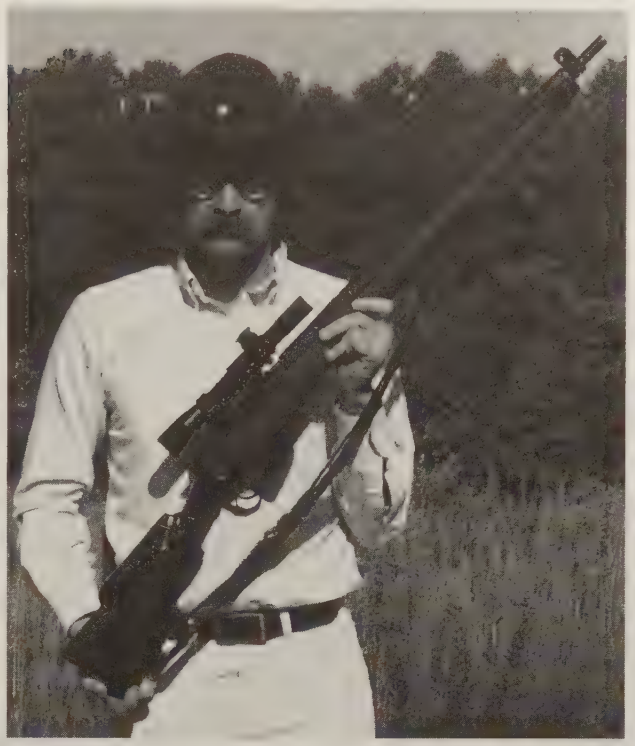
developed such modification kits that consisted of a new bolt head, new barrel, and magazine, Fortunately the sight graduations were close enough if the yard sights were read as meter sights because the .308 (or 7.62x51mm NATO) round was about 10 percent more powerful than the .303, and a meter is about 10 percent longer than a yard.

In retrospect, this whole program seems silly. The L1A1 (or English copy of the FN-FAL) was rapidly coming out of the arsenals, and it took almost as much effort to rebarrel a No. 4 to 7.62x51mm NATO as it did to make a new L1A1. Units felt slighted if they had to settle for the No. 4 rifle instead of receiving the newer L1A1, and Commonwealth countries that were either too poor to buy the conversions or rich enough to make their own versions of the L1A1 (such as India) were happy with stocks of .303 ammo available at giveaway prices as opposed to new production 7.62x51mm NATO—or, best of all, got the Soviets to give them brand-new AK-47 rifles. Conversions went nowhere except for target shooters, police rifles, and sniper rifles such as the L42A1, which is covered elsewhere.

In 7.62x51mm NATO, the No. 4 rifle kicks more than the .303 version, but otherwise it is the same. I find my Sterling-converted No. 4 rather amusing, but except for the fact that .308 ammunition is now cheaper than .303, I do not think it has much to recommend it. I agree with the market that determined that the world just did not need a 7.62x51mm NATO conversion for No. 4 rifles.

ENFIELD NO. 4T "SNIPER"

Germany was first to get an active sniping program going during World War I, but by the end of the war Britain had fielded far superior snipers. This was mainly a result of excellent fieldcraft and experience plus attitude, because the equipment was certainly no better than what Germany had to offer. But as with many things when a war is over, the sniping program fell into disuse. World War II then started, and memories of what had occurred in World War I prompted the early development of specialist sniping rifles.



The Enfield No. 4T was probably the best sniper rifle of World War II.

The British really did not have a lot to work with: only the No. 4 rifle plus scopes that had been designed to fit on the Bren gun, but which, as it became obvious to all quickly, were not very useful. The British military coupled the No. 4 rifle and the Bren scope with the aid of such excellent gunsmiths as Holland & Holland and placed it on the battlefield as the No. 4T. By today's standards, as sniper rifles go, it is not much, being more suited to work of 600 yards and below, but viewed from the perspective of the time, it looks very good. Certainly, it was better than anything the other Allies fielded.

Although the No. 4 rifles used for sniping work were allegedly tested and fitted, the No. 4T rifles I have encountered do not show any special work on the triggers. The stock may have been carefully bedded, although I think a good No. 4 will shoot as well as any No. 4T with the scope removed. The rifles were

modified by putting on a detachable scope mount and a cheekpiece. Iron sights were retained, which is a plus, but the scope was mounted low. The iron sights could not be used when the scope was fitted, but the scope mount and scope could be removed by loosening the thumb screws. The base stays since it is staked to the receiver. Unfortunately, actual firing tests show that removing the scope and then reinstalling it will move the POI an average of 2 inches up and 2 inches to the side at 100 yards. This is impossible, so I assume that any sensible sniper never removed his scope for fear that his scope would be rendered totally worthless. If that is the policy anyway, why not make it a permanent mount that can only be removed with a screwdriver and eliminate the temptation to take the scope off?

The No. 4T has a detachable scope mount, as seen here in this left-side view. However, even though the scope can be removed, it is not a good idea to do so because it adversely affects the shooter's POI.

The comb is fitted to allow easier use of the scope while still permitting the iron sights to be used if necessary (right-side view).

The cheekpiece is a nice addition because it allows you to get your head high enough to use the scope, yet you are still low enough to use the iron sights if needed. I have to raise my head slightly to use the scope and press it firmly down to use the iron sights, and although this is not perfect, it still is a definite improvement over many such scope-sighted military rifles.

The reticle consists of a very nice, dark, straight line and a heavy post. The straight line is designed to minimize canting, and the post looks like a front sight blade. I like it and have had many hunting rifles over the years fitted with such scope reticles. It is a very fast reticle and easy to use. However, although it is an excellent hunting reticle for the early morning and evening light because it is distinctive enough to pick up rapidly, and it is quite deadly at 300 yards or less, as you go out past 400 yards, I will admit that it is too

coarse. For a battle rifle or a hunting rifle, it is great; for a sniper rifle to be used at 600 to 800 meters, it is not. I have always thought that the best design is one that has a post that could be flipped up when desired or dropped to expose standard cross hairs when greater precision was needed.

The availability of iron sights, and actually quite good iron sights, is a real benefit: it allows the sniper to operate as a member of the infantry squad in the event the scope is disabled for some reason.

As I noted earlier, optics is one of those areas that has greatly improved over the years. The No. 32 scope was fitted with 1930s optic technology lenses, and compared to today's standard scopes, the field of view was narrow and the image was dull.

The detachable-box magazine is a nice feature because it avoids the single-loading feature of many sniping rifles that can be such a problem in cold weather. A few extra magazines carried fully loaded (perhaps one with tracer, another with armor-piercing, and two more with good-quality ball ammunition) would be the way to go.

The No. 4T is a heavy rifle, weighing close to 12 pounds loaded and has a 25-inch barrel. Recoil is light, and blast and flash are both low. However, it is long and muzzle heavy. Off-hand and kneeling positions are both hard to maintain because of weight and poor handling features.

The weapon lacks a cleaning rod but does have a butt trap for a pull-through and other cleaning equipment. The buttplate is solid brass, and its shape causes it to hammer the shoulder. For that reason, prone shooting over sandbags was distinctively uncomfortable when I was dressed in short-sleeved shirts.

The rifle tested had a somewhat sticky action, was not sighted properly, and yielded disappointing accuracy results of about 2 inches at 200 yards. Perhaps with different ammunition, I could do better, but in any event, I do not believe this to be an 800-meter rifle.

Although I think there is a lot wrong with the No. 4T, it is only fair to say that it served the British army in good stead: the L42A1 is merely a slight modification of the No. 4T, and the former was still being used by some active-service units in 1994. However, despite its history as perhaps the best Allied sniping rifle fielded during World War II, with a little more thought and the application of more refined resources, it could have been a lot better.

NO. 5 ENFIELD

This is a real rifle! While the British were fighting in the jungle during World War II, the call went out for a lightened version of the Enfield rifle. With their 25- or 26-inch barrels, the No. 1 MK III and No. 4 rifles were simply too long. After a lot of testing and modifications came the No. 5, or the so-called "jungle carbine." Mostly seen in Burma during late 1944 and 1945, this rifle was not as widely issued as anticipated because the war ended earlier than anticipated in August 1945. Everyone had figured that the war with the Japanese would continue until 1948.

At first glance, this rifle seems to merely be a cut-down No. 4, but that is not true because the action has been lightened also. In fact, because of those cuts to lighten the rifle, the No. 5 action cannot be used safely with the 7.62x51mm cartridge. That is unfortunate, since it would be dandy in that caliber.

The No. 5 has a barrel of 20 inches and a rather elementary flash hider. The flash hider also acts as a bayonet attachment point, if that matters to anyone. The No. 5 bayonet is much better than that found on the No. 4, which was merely a blade or, worse, a spike. At least on the No. 5, it could be used as a knife. The sights are protected by wings, and the front blade is of a good size. As in previous Enfield rifles, the action is quite quick to work, and the rifle holds 10 rounds fed from a detachable magazine. Again, it was anticipated that stripper clips would be used to reload the weapon, but I am certain some soldiers stuffed extra magazines away.

The sights on the No. 5 are the best yet: they are of the peep variety with a big peep

for rapid, close use and a finer peep for longer range but with a maximum of 800 yards. I doubt anyone ever shot a No. 5 at real enemy targets at more than 300 yards except, maybe, when shooting across the Irawaddy River in Burma.

The author found the No. 5 Enfield to be a very nice combat rifle. Note the case about to exit the action, the way the butt rests firmly on the shoulder, and how the bolt handle fits into the palm of the author's hand.

The buttstock has a pistol grip like the one on other Enfields, but the swivel is fixed and mounted on the side of the stock. Attached to the butt is a rubber recoil pad. This not only takes up some of the recoil (which is slightly heavier than on the No. 4 because it weighs less and typically will be shot by soldiers operating in hot climates and, thus, attired in short sleeves), but it also remains firm on your shoulder when firing quickly, unlike the brass or gun metal buttplates on the No. 4 or No. 1 MK III, which have a tendency to slip off. Now 50 years or more after they were made, most of these rubber buttplates have perished, and they are all solid and hard, although an occasional specimen is seen that is better.

The forearm on the No. 5 is shaped like a sporter rifle, except that an upper forearm is still present, which is nice because it allows you to grasp the rifle as you run forward after shooting without burning your hand as would happen if it did not have the covered top forearm. The front swivel will make noise if not wrapped.

The No. 5 is both fairly short and fairly light. It is well balanced and points well. Unfortunately, the rifle has always been plagued by an erratic zero problem. Some rifles have no zeroing problems, while others do. This caused the No. 5 to be withdrawn from service—no matter how nice and handy a rifle is, if it will not place its bullets where intended, it is not worth having. Perhaps if the L1A1 had

The rear buttstock on the No. 5 Enfield has a rubber pad that cushions recoil and helps prevent the stock from slipping off the shooter's shoulder. Unfortunately, on many examples seen today, the rubber has disintegrated, so that the recoil-cushioning effect is diminished.

been developed beginning in 1953, more work would have been directed toward identifying and eliminating this problem, but by then it was obvious that the future British service rifle would not be a bolt gun. I would imagine a good fiberglass job would cure this problem today, and if I had one I used a lot and it had a zero problem, that is how I would fix it.

180 RPM BOLT ACTION—THE WALBRIDGE METHOD

Times of crisis often bring interesting solutions to problems—solutions that disappear when the crisis is overcome and new technological developments arise.

In the aftermath of the German invasion of France, the British Expeditionary Forces were huddled on the beaches of Dunkirk. By the time they escaped across the Channel, fewer than 2,000 Bren LMGs existed in England, and Britain alone faced the might of the German army. After the defeat in France, the British army created small raiding units to harass the Germans. Originally called "Leopards," these were renamed "Commando" units by Winston Churchill, who had served in the Boer War (South Africa, 1889–1902) where such raiding units of highly skilled Boer marksmen had been called by the same name.

A training school was set up in Scotland where innovative ideas were developed to make the lightly armed, highly mobile units more effective. Many famous people were at such schools training unskilled British troops in the lethal skills learned in peacetime in the streets of Shanghai and the game fields of Africa. Fairbairn and Sykes of the Shanghai Municipal Police taught hand-to-hand combat and pistol shooting at the Special Warfare Training Center. Also teaching at the center was Captain P.N. Walbridge, a highly proficient rifleman in prewar British competition. In fact, the famed Fairbairn asked Captain Walbridge to write the rifle section of their joint book, *All in Fighting*. This book attempted to provide written instruction in how to handle a rifle in combat.

Among the techniques detailed in Walbridge's section of the book was a method that showed the shooter how to convert his Enfield rifle into a LMG. It will be recalled that the British troops at Mons in 1914 were able to fire their Enfield rifles so rapidly that the Germans thought that they were facing Vickers machine guns. Rapid-firing exercises were common in British army and civilian competition circles before 1914 and continued in the interwar period. Walbridge's method was, however, even faster than standard British rapid-fire exercises.

With the Walbridge method, instead of gripping the small of the stock with the thumb, it is kept on the bolt. The trigger finger is left on the bolt and the middle finger is used to pull the trigger. Or the trigger finger can be used to pull the trigger and then immediately is placed on the bolt and pulled to the rear. The shooter places the bolt of the rifle on his shoulder, leans into the rifle just as he would with an automatic weapon, holds his head high, and concentrates on the target. An illustration showing this technique accompanies this chapter. Using the Walbridge method and a fast bolt-action rifle (such as the SMLE), a well-practiced shooter can fire up to three rounds per second. Naturally, accuracy will suffer when this method is used, but it is no worse than when firing an open-bolt machine gun. Of course, the technique is used only for close-range assaults, city fighting, or crossing open spaces under fire.

With the general adoption of the SMG for many troops and then the development of semiautomatic rifles, the bolt-action rifle gradually faded from the active scene in the postwar armies of the world. The bolt-action magazine-fed rifle allows the trained shooter experienced in the Walbridge method to get the good trigger pull of the bolt action and the rapidity of fire that comes with the semiautomatic rifle. It makes the best of both worlds and requires only a trained person to achieve the results.

L42A1

When Britain entered World War I, it lacked any real sniper training or equipment. Despite the efforts of the British army in developing sniping skills after the Boer War, they turned out to be sadly lacking. The British had good riflemen, but they did not have any type of coordinated sniping policy. The Germans soon jumped out front in the sniping war by sending hundreds of optically sighted rifles to the front to be used by former hunters. These men wreaked havoc on the Allies for quite a while until the British army developed its own program.

A close-up of the Walbridge method using the middle finger to fire the weapon with normal trigger finger and thumb holding the bolt.

An alternative method of firing a weapon using the Walbridge method uses the trigger finger in a standard role with the thumb atop the bolt hand rather than around the stock as would normally be the case to obtain greater speed in working the action.

Finally, under the leadership of Hesketh-Pickard and others, the British sniping program took shape. Not surprisingly, under the tutelage of the independent-minded shooters and hunters of the British Empire, by 1916 the British really dominated the sniping war on the Western Front.

Alas, when November 1918 rolled around, everyone thought the days of war were over, and military organizations always seem to lack an understanding of what to do with snipers in peacetime (or perhaps they are suspicious of any group with specialized skills and an independent mind-set). As a result, after the war, the snipers all seemed to have been ignored. By 1939 when World War II started, all the old snipers had long since gone home, and once again the British military suffered from their lack.

The effort to organize an effective sniping program during World War II moved more quickly, because the British could build on the platform laid in the previous war. During World War I, British snipers had used open-sighted weapons and the M1914 Enfield, in addition to a wide variety of commercial sporters. During World War II, Britain developed the No. 4 T sniping rifles, which

The L42A1 represents the last use of the Enfield rifle by British forces. It is not a state-of-the-art sniping rifle; rather, it is a rifle put together by people with a lot of experience but limited resources.

were specifically selected No. 4 Enfield rifles that had been modified to sniping configurations by Holland & Holland, among others. As might be expected, this was again a hurry-up project that was forced by the demands of war to use items that really were not the best but which, in the typical English style, were used in a dogged fashion. For instance, there seems to have been no special match-grade ammunition developed for the sniping unit. Rather, snipers were told to test quantities of ammunition and select the best ammunition for their work. Permitting 19-year-old enlisted men to make such selections—when opportunities to test the supplies are likely very limited and facilities to do the testing primitive—does not strike me as sound. Similarly, lacking a proper sniper telescopic sight, the British took the No. 32 telescopic sight, which had been developed for the Bren gun but had not been used because it was obviously unnecessary for a box-fed LMG, and installed it on the No. 4 rifle.

It is perhaps a credit to all those British and Imperial army soldiers that the snipers did as well as they did. Obviously, what the soldiers lacked in equipment they made up for in skill, experience, and enthusiasm. One wonders what would have happened if the British had not had a pool of hunters and target shooters to draw from at the time. I rather doubt that such good results from the snipers would have been forthcoming. For some interesting insights into this area, I refer the readers to *Sniping in France* and *With British Snipers to the Reich* (the latter is by Captain C. Shore, Small Arms Technical Publishing Company, Georgetown, South Carolina, 1948).

When the dropping of the atomic bombs on Hiroshima and Nagasaki ended World War II in 1945 (thereby saving a generation the losses sustained in World War I on the Somme, in my judgment), once again the British sniping program went into limbo. The British adopted the L1A1 rifle in 7.62x51mm NATO, and all the old No. 4T sniper rifles were .303. Soon, however, commitments all over the globe reminded everyone that the a sniper rifle was needed. Once again, the British decided to do it on the cheap and developed the L42A1.

The British took the old No. 4T rifles, and those that were fit for remodeling were set aside and modified to L42A1 specifications. Basically, this consisted of converting the weapon to fire the 7.62x51mm NATO rimless round, installing a fairly heavy straight-taper barrel, and cutting the wood back to more closely resemble a sporter rifle. The British weapons designers kept the old sights, claiming that the velocity difference between

.303 and 7.62x51mm NATO was such that 100 yards equals 100 meters on the scales (it is close). Even the scopes were retained.

The example I tested was manufactured in 1971, although the action had been obviously made before 1945. The No. 32 scope also dated from the pre-1945 era. Although I liked the post-type reticle for hunting purposes, I must say that using it and a 2 3/4-power scope limits the whole project. Additionally, there has been a lot of development in optics since 1945. Now, I realize that much development also took place from 1971 (when the test example was made) to 1994 when I tested the rifle, so I compared it to the scope on an M21 Vietnam-era sniper rifle. The optics on that M21, which were state of the art in 1970, were clearly superior to that found on the pre-1945 No. 32. On a clear, bright day on the range with targets at known distances, it did not make a major difference, but as darkness approached, I found that I could get 15 to 20 more minutes of effective shooting out of the M21 than I could from the L42A1. Additionally, although the No. 32 does adjust for elevation and bullet drop, it does not have a mechanism for the shooter to judge distances integral with the scope, unlike with the M21 unit. This is a serious failing, especially as you go out beyond 400 meters, where an error in estimating distances can cause you to be way off.

Besides these problems of optics, the rifle seemed very muzzle heavy and hence did not balance well. This was important when firing from the sitting and kneeling position and even more so in the off-hand position. I realize that sniper rifles are often fired from the prone position, but even so, a well-balanced rifle is a thing of joy while an ill-balanced piece is cumbersome. The barrel at 25 inches is way too long and heavy; you do not need a long or heavy barrel to get accuracy. My M700 Remington with a very light 18-inch barrel would outshoot the L42A1 at every distance tested with the same ammunition.

The scope mounting seems primitive by today's standards because it is soldered on and then staked in place, but it does seem to work and that is what is important. The trigger is a typical Enfield two-stage, and nothing seems to have been done to make it crisper. Because a good trigger is the key to good rifle shooting, it is hard to see why this

A rare photo of a British sniper (Pete Bloom, Royal Marine Commandos) in Northern Ireland, armed with an L42A1. This photograph was taken in the summer of 1972, at the height of "The Troubles" in the New Lodge area of Belfast. Note the Scout Regiment telescope still in use after 70 years.

Right side of an L42A1 Enfield rifle and the target showing a three-shot group shot at 100 yards with 168-grain Federal ammunition.

point has been ignored. The buttplate has a trap on it to hold cleaning supplies, which is good, but the plate is very smooth and slipped when I shot it wearing a light cotton shirt. The plate should be roughened enough to avoid this slippage.

I rather like having the iron sights on the sniper rifle because a scope can always fail or get damaged. The sights are rather typical Enfield No. 4. The front sight is well protected by wings and is a blade. I would want my sight painted white, however. The rear sight has a lot of adjustments on it that are probably unnecessary, especially for an emergency sight, and a simple fixed peep set for 200 yards would be sufficient.

The bolt-action system is typical Enfield and very fast, and the safety is convenient to the right-handed shooter. Obviously, the L42A1 is not suitable for the left-handed shooter, although it can be fired from the left shoulder in an emergency. Still, it is odd that armies are willing to miss 11 percent of their available pool by virtue of issuing rifles suitable only for right-handed shooters.

Accuracy on the L42A1 when tested with 168-grain Federal Premium ammunition was no better than what I would expect from a good sporter rifle. Certainly, it was not up to the standard we have all come to expect from police or military sniper rifles, where half-inch or smaller groups are common. When you compare the L42A1 with the Remington M40 sniping rifle, it becomes painfully apparent that the L42A1 is way behind. Although suitable for perhaps 500 yards on military targets when you need only to hit the enemy someplace, it is not suitable for the extreme long-range work that the M40 is capable of, nor is it suitable for the high-precision work demanded of a police rifle when immediate incapacitation is required even though the range may be less than 200 yards.

The L42A1 represents the last use of the Enfield rifle by British forces. These actions

served the British nobly for 100 years or so and should be viewed in that respect. This is not a state-of-the-art sniping rifle; rather, it is something put together by people with a lot of experience but limited resources. Treat this as an honorably discharged veteran of many campaigns and do not expect too much of it today.

L85A1

I approached the L85A1 rifle with great reservations because I had read so many bad things about it: that it was heavy, it jammed, it couldn't be fired off the left shoulder, and all the other problems typically associated with a new design and the criticism that old soldiers make on any new weapon. My friend Pete Bloom, a retired Royal Marine, had written a very detailed and critical report of the weapon in *Guns Review*, and Jan Stevenson of *Handgunner* fame, who had adopted the weapon as a trademark for the magazine, had become so alarmed about the defects in the rifle that he became one of the leading critics of it. However, I have always detected more criticism of the developers and the government bureaucracy that operated the enterprise than of the weapon itself.

Although many people have criticized the L85A1, and, to my knowledge, only very limited orders have been placed for the weapon, except for British use, I still believe it is important enough that it needs to be evaluated. The sun may have set on the Empire, but the British are still engaged in active combat daily in many places around the globe, and they train frequently and hard, subjecting their weapons to a lot of abuse. By good luck I was able to test it for this volume.

The first thing you note when handling an L85A1 is how short it is—it is actually shorter than an H&K 53 SMG. Yet it has a 20-inch barrel, as opposed to an 8.5-inch unit, which naturally robs the 5.56x45mm cartridge of much of its potential. Despite the fact that many people have complained about the weight (10 pounds or more loaded with the SUSIT sight), it balances very nicely between the hands and does not feel heavy on the march. This is in contrast to the Galil 5.56x45mm rifle, which actually weighs about 20 percent less but feels a lot heavier when being handled. Much of a weapon's handiness is determined by its balance, and the L85A1, at least in my hands, feels "alive" and handy. This came as a pleasant surprise; because I think a 6-pound rifle is more suitable, I was ready to criticize a 10-pound 5.56x45mm rifle. But it was not bad, and certainly on fast repeat shots, the extra weight, coupled with the fact that the muzzle flip is close to the hand (thereby minimizing the leverage effect of the recoiling barrel), allowed very fast repeat shots when fired in a semiautomatic mode.

Most bullpup rifles have a terrible linkage system, resulting in poor triggers. The trigger on the L85A1 will never be confused with that of a match rifle, but it is distinctly superior to the one on the M16A1 rifle I was shooting the same day.

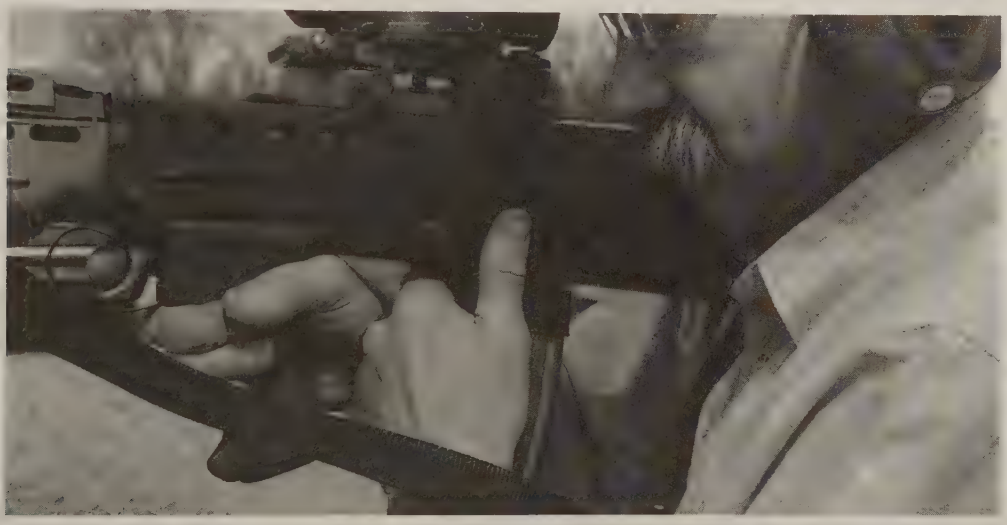
The safety is conveniently located and can be flipped off quickly with finger pressure even in the dark. You do not need to break your shooting grip to push it off, and, actually, it was much faster to operate than the thumb lever found on the G3 rifle—much less like the AK-47 and its variants.

The trigger guard does not fold down or flip to the side, as it does on the M16 or SIG 550, but it is fairly big and would accommodate gloved fingers—although I prefer a fold-down or -away guard to allow a mittened hand to work as well. I suppose a lot of work in Ireland contributed to this good-sized guard.

The magazine release is a protected shelf and button. I understand that on the original models, the shelf was not high enough and the soldier could bump the magazine release with his body, allowing the magazine to drop loose. I did not encounter this problem, so either the deeper shelf or the stronger spring fitted to the L85A1 models solved the problem.

Although many have commented about the magazine release's being awkward to

The author found the L85A1 to be a quick-responding, accurate, handy rifle that never malfunctioned.



To remove the magazine, the author first hits the release button with his thumb and then pulls the magazine down and out of the weapon.

operate, I found it to be actually quite quick. You simply remove your left hand from the foregrip, bring it under your chin, push the button, and drop your hand down, thus pulling the magazine out. Obviously, it is not as fast to reload a magazine as it is a more conventional rifle; however, it certainly is not as slow or awkward as I had been led to believe by the many reviews I had read.

The action has a dust cover much like the one on the M16, which I like, and a handle on the bolt to assist in closing the action or pulling out a stuck case. Although it does not appear to be as sturdy as I would prefer (I have kicked them out of an M14 rifle with the edge of a combat boot), it certainly is better than the M16 system, where you push on a plunger or pull an operating rod back, neither of which is likely to give you nearly as much pressure. The action has the same dual-spring system as the AR-18/180 series, and I think the springs seem rather soft. By this I mean the action did not spring closed with a rapid slam when the bolt was released. I anticipated malfunctions, but none occurred—although I did notice when taking close-up photos of the action being fired that the empties seemed to fly in different directions each time the weapon was fired. One empty would go to the front, the next to the rear, to the middle a few times, and then the rear, and so forth. No pattern was obvious, perhaps as a result of the extractor spring's being weak. All cleared in a satisfactory fashion, but I guess I am spoiled by SIG rifles that throw all the empties in nearly as tight a group as the rifle throws bullets. To me, such ejection consistency should mean something, although in actuality it appears to mean little if anything.

The rifle has a cleaning kit in the pistol

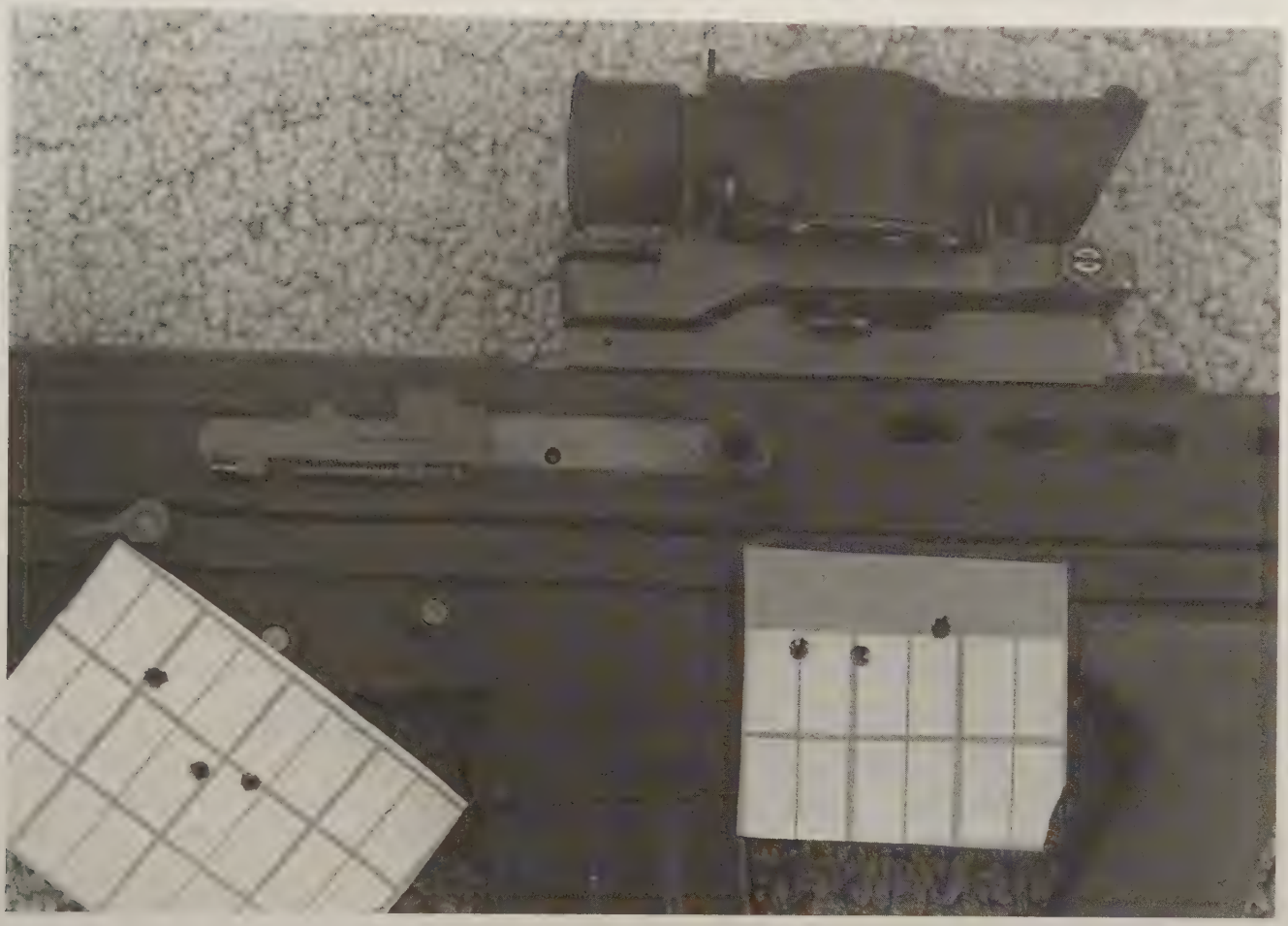
The British military on the range with the new L85A1 rifle fitted with the SUSIT sight, which is issued on rifles destined for units anticipating ground contact. It is the sight that really makes this rifle.

The L85A1 fitted with iron sights go to most of the troops, except infantry and special users, who get the scoped rifles.

grip, which is nice, although I always prefer a solid rod. Naturally, this would not be feasible to put in the buttstock, as you do on an M16A1 rifle, but it could be carried elsewhere. The flash hider is open on the bottom, unlike on the M16A2, and the blast exiting the barrel will pierce sandbags, blowing up dust and sand and thereby alerting an enemy to your location. The bottom should be closed to prevent this problem.

The selector is located at the rear of the rifle and cannot be flipped into position rapidly. I do not think that hand-held, full-auto fire is effective, anyway, so I do not view this as a disadvantage. I am perfectly satisfied with a fast-firing, semiautomatic combat rifle and think full-auto fire becomes effective only when you get up to the squad automatic level. Even then, I am not totally convinced, at least with regard to infantry combat, that a semiauto might not yield better real-world results. Firepower is, after all, bullets hitting people, as Melvin Johnson said.

The real strength of the L85A1, besides the obvious one of short overall length (that results in a lively balance and ease of use in vehicles or urban or jungle environments), is the SUSIT sight unit. This is a fairly massive, solid unit of 4X magnification. It contains a translucent pointer system containing a radioactive element, whose glowing sight allows the shooter to fire at night. Unlike



Two groups shot at 100 yards with IMI Match (69-grain) ammunition by the author in the prone position.

many such units, this one glows red/orange, which shows up well on targets at night and is an interesting change from the more commonly encountered green.

Adjustments for the SUSIT are in the mount rather than the unit itself. I found that interesting in light of Jeff Cooper's comments involving his "Scout Rifle" project. Colonel Cooper stated that the biggest problem with the scopes was keeping them functioning because, he believes, the scopes are more fragile than need be as a result of the adjustments. Having the adjustments in the mount rather than on the scope itself makes for a stronger unit and substantially decreases the number of things that can go wrong with the scope.

The advantages of using a scope on a rifle are well known to most. The shooter has only one dimension to deal with, and he can see the target with more detail and definition. The SUSIT is a 4X unit, unlike the AUG's 1.3 X, and that caused me to wonder whether it would be slow on close-range targets. (I believe it is always more critical to be able to use a weapon quickly at close range than it is at long range because close-range targets are typically more dangerous.) To determine how a weapon works at close-range, fast targets, nothing beats shooting flying clay birds. If you can yell "pull" and shoot a clay bird at 25 yards or so, the weapon is suitable for engaging an enemy soldier at 10 yards who jumps out of the bush with his AK-47 in hand, as happened to a friend of mine in 1968.

I tried the AUG on clays and was pleasantly surprised to find it very effective, hitting several of them in rapid succession. The

L85A1 with its 4X SUSIT is not as quick off the mark—it took a little time to get used to the scope and locate the flying clay in the field—but once I figured out how to do it, I was able to blow them to pieces with my L85A1 rifle. (Frankly, I have found that scopes are better than iron sights for shooting clay birds: my best shooting ever was with a Remington M700 .308 fitted with a 1.5x5 Leupold scope. Not to brag, but I did one run of seven out of seven. Of course, I did that only once, but it does show it can be done.) Also with the L85A1, you can at least engage long-range targets, whereas I find the AUG very difficult to hit targets beyond 300 meters because of the scope reticle. With the L85A1, I got 3 7/8-inch groups at 300 yards, and I found it effective on man-targets at 500 meters. Later, when I tested it at a measured 995 meters, I had no difficulty hitting a 36 bull from the sitting position even though the limited 800-meter elevation of the SUSIT caused me to have to aim over my target. Any time a 5.56x45mm rifle can engage such a target at 995 meters, somebody is doing something right.

Conventional wisdom about the L85A1 led me to expect to find it unreliable, inaccurate, heavy, and ineffective. Instead, I discovered a quick-responding, very accurate, handy rifle that never malfunctioned in my hands. It clearly cannot be shot off the left shoulder, but whether this is a big issue, I leave to the reader. I have very rarely seen troops fire off the weak shoulder. Most do poorly enough off their strong side for it to be scary: I cannot imagine how they would do with the weak side position. If the situation is called for, I believe that backing up from the corner or tilting the weapon over will yield the same concealment from incoming fire and better shooting results, and the shorter overall length is especially beneficial in an urban environment. I liked the L85A1 rifle.

ACCURACY INTERNATIONAL

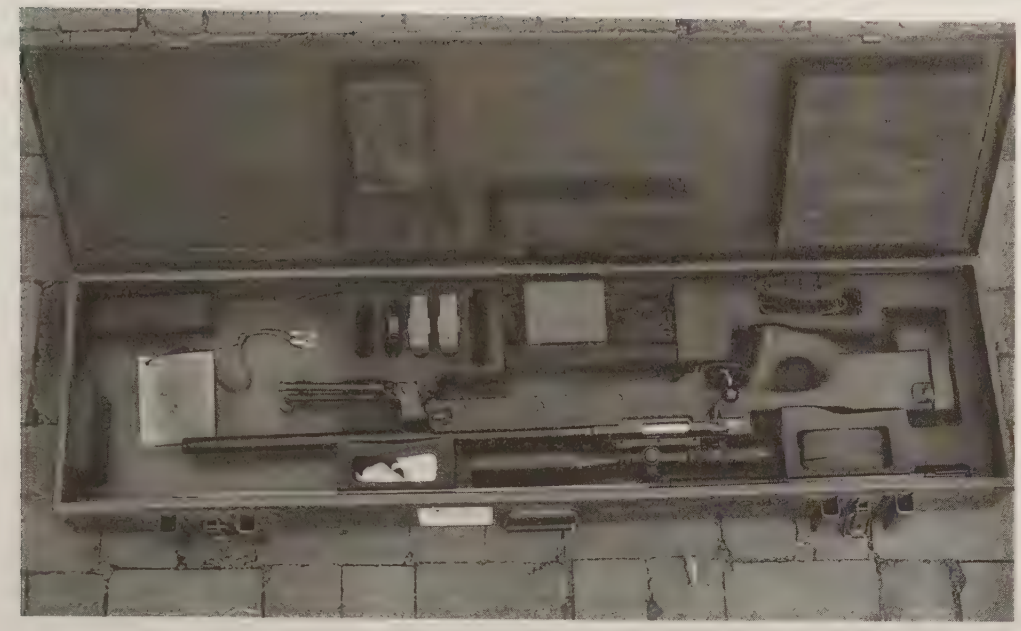
The British labored from 1939 to the early 1980s with the Enfield No. 4T or its successor, the L42A1. Although the No. 4T may well have been the best sniper rifle of the 1939 to 1945 period, clearly it had become out of date by the 1980s. So noted British marksman Malcolm Cooper set about to develop a new rifle, which he succeeded in doing, the Accuracy International. After many trials, the British and Swedish militaries adopted it as their standard sniper rifle. It has also been adopted by many foreign special-response units as well as British and foreign police agencies. Through the kindness of the Gunsite Training Center in Arizona, I was able to obtain a rifle to test and evaluate.

The rifle came in a very sturdy, well-fitted-out aluminum case painted green. It was a fine case, but I was rather put off to discover that it cost $325. The same or better case can be obtained from Native Americans in Montana for $200 or less. And you can paint it green if you must.

Upon removing the rifle from the box, it seemed very long, with its 24-inch barrel, and heavy at 15 pounds. The trigger pull was quite good and broke cleanly and crisply, always a good sign. The scope was a 3X12 power Schmidt & Bender, which has a 92-percent rating. This is great, but the $1,350 price tag diminished my enthusiasm somewhat: U.S. scopes that get close to 92 percent cost only half as much. Is it sensible to pay that much more for a few extra percentage points? Only the purchaser can decide, naturally.

The rifle is not fitted with iron sights, which I always find a questionable practice on a military sniper rifle that is subject to much wear and tear. On a sporter that will be used to hunt game, a misaligned scope will not mean too much; on a military rifle, the soldier's life may rest on his ability to hit a target. Although you can instinctively shoot a rifle out to 100 yards and hit man-targets, I do not think that it is feasible to do so at 200 yards. This rifle should be fitted with iron sights for emergency use, just like the No. 4T and L42A1.

Taking the Accuracy International to the range, I set up my sandbags and started



The Accuracy International 7.62x51mm NATO sniper rifle comes in a very handy aluminum case to hold the rifle, extra magazines, and cleaning supplies. The sniper, whether military or police, should strive to keep his rifle in the case as much as possible to reduce problems with the weapon jamming or the zero getting lost.

This British sniper tests the new Accuracy International sniper rifle that is now replacing the L42A1 in the British military. It is equipped with the superb Schmidt & Bender scope.

shooting. I used 168-grain Federal softpoint premium ammunition. I was able to get three-shot groups at 100 yards of 9/16 inch and 2 7/16 inches at 505 meters. I am certain that if the rifle were in better hands and if a better rest were used, it would be possible to trim a little off those groups, say one-third of a MOA rifle shooting rather than one-half or so. Still, one-half-MOA rifles are not to be sneezed at by any means.

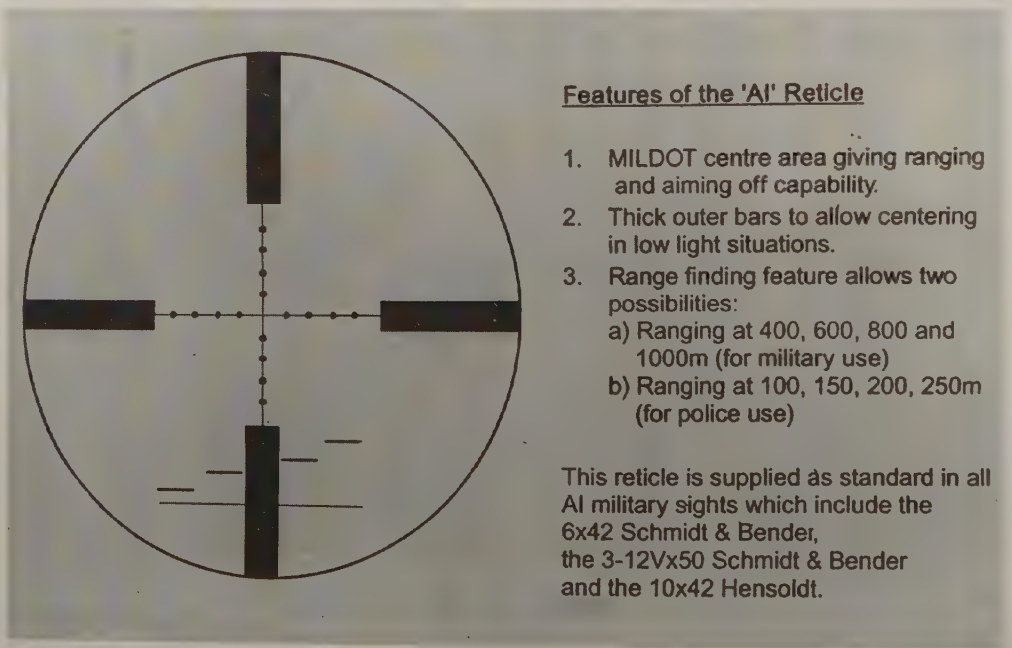
The rifle is quite muzzle heavy and thus poorly balanced. This weight and balance point make it very difficult to use in the off-hand and kneeling positions. I realize that typically snipers will fire from a rest, but going in and out of position, the sniper may encounter the enemy and need to defend himself. The rifle should be capable of being shot easily from the off-hand and kneeling position. The Accuracy International is not.

The Accuracy International has a very slick action with

a nicely sized and shaped bolt knob virtually as good as on a Krag or a Schmidt Rubin; however, the safety was poorly positioned, which slowed up response time. Because of the pistol-equipped stock, your thumb could not simply flip it off. I would think that anyone developing a rifle from scratch would fit it with a safety that could be flipped off without taking the shooting hand from the grip. This is especially critical in police or counterterrorist operations where a long wait may be called for and a very light trigger is fitted. Merely flipping the safety off and waiting for the shot is too hazardous in such situations.

The rifle stock is made out of fiberglass, and the whole stock is merely a shell fitted around the action. It is the action design that supposedly gives the weapon its accuracy. The toe of the stock is fitted with a projection to allow the nonshooting hand to steady the stock when shooting off a bench or other rest. This

The 3X12 Schmidt & Bender scope is clearly the most impressive aspect of this sniping rifle. It is capable of achieving a 92-percent rating, but it costs about $1,350. U.S. scopes that get close to 92 percent cost only half as much.


Features of the 'AI' Reticle
1. MILDOT centre area giving ranging and aiming off capability.
2. Thick outer bars to allow centering in low light situations.
3. Range finding feature allows two possibilities:
a) Ranging at 400, 600, 800 and 1000m (for military use)
b) Ranging at 100, 150, 200, 250m (for police use)
This reticle is supplied as standard in all AI military sights which include the 6x42 Schmidt & Bender, the 3-12Vx50 Schmidt & Bender and the 10x42 Hensoldt.

The reticle design found on the Schmidt & Bender scope seems quite complicated at first glance, but spending a little time in practicing with it on the range makes the features all useful and helpful.

projection is shaped much like the toe on the MG34/42 LMG and serves much the same purpose. The stock itself can be adjusted for length so the weapon can be used by different-size marksmen and in different climactic conditions when more clothes may be worn. This is a nice touch. However, the stock itself is too wide, and the forearm is flat and quite uncomfortable. When the bipod is folded back, it makes the stock even wider and less comfortable to hold and use. With the bipod legs forward, the weapon is even more muzzle heavy. The bipod itself is heavy but is capable of multiple adjustments and seems rugged (despite the fact that the springs holding the legs seemed weak and were easily dislodged). POI did not seem to shift when it was used. Oddly enough—especially considering that the rifle recently replaced the M41 as Sweden's official sniper rifle, the trigger guard is small and does not swing down or out of the way for winter use. Again, I would think that a trigger guard that permits mitten use would be in order, especially in Sweden. Long periods of inactivity are frequent for snipers, and mittens are common. The rifle should be capable of being fired with a mittened hand. Regrettably, the Accuracy International does not offer this feature.

The sling swivel rattled because it allowed metal-to-metal contact, failing the "jump test." Of course, you could tape them, but it seems like an odd thing to have to do on a specially designed sniper unit. The black stock and barrel also were quite distinctive in appearance. This can be fatal on the battlefield. Although the sniper may well wrap his rifle with burlap to break up the outline, it should be painted at the factory to do the same thing.

The 3X12 power Schmidt & Bender is clearly the best part of this sniping rifle. It is very clear and bright. Having tested many sniper rifles, I was impressed with the optic quality. It was especially obvious when I compared it with the optics found on the Vietnam War-era M21 sniper rifle I shot the same day. The only criticism of the Schmidt & Bender scope I have (besides the cost) is that the scope adjusts in one-half MOA. This is really too coarse. At a minimum, it should adjust in one-quarter MOA or, even better, one-eighth. It makes a big difference the closer we get to 1,000 meters, and this rifle is a true 1,000 meter-man-killer.

Overall, my impression is that the Accuracy International's weight and long barrel result in low recoil and report. It is a very accurate rifle from the bench or prone position, but its weight and stock style make it difficult to carry in the field and slow to put into operation. To be a truly useful infantry sniper rifle, it should weigh half as much and be 6 to 8 inches shorter. Given a choice between my M700 Remington rifle modified to accept M14 magazines with an 18-inch barrel (which weighs 7 1/2 pounds loaded and equipped with a 1.5X5 power Leupold scope) and that shoots into three-fourths MOA (although I did shoot a 2 3/4-inch group at 480 yards using the same Federal ammunition shot in the Accuracy International on the same day and shot a 2 7/16-inch, 505-meter group with the Accuracy International Rifle) and the one-third-MOA Accuracy International, I would pick my M700 every time. With my M700, I can shoot 5-inch groups or less at 500 meters and still hit flying clay birds. Once on a particularly good day, I got seven out of seven and 50 percent overall during the day. The Accuracy International may shoot smaller groups, but it is not nearly as practical and user friendly.

The Brits and Swedes have a nice, accurate rifle here, but I have my doubts that their current snipers are really better off than their fathers were with the L42A1 or M41 rifles. Perhaps fitting the beautiful 3X12 Schmidt & Bender Scope on the old rifles and working on the trigger would have gotten better real-world results than was achieved by adopting the Accuracy International rifle.

Greece

03/14 GREEK RIFLE—6.5X54 MM

The example tested, made by Breda in 1927 for the Greek government, is a well-made piece of equipment. This rifle, as with the carbine version, has the rotary-magazine system. Such a system is wonderfully smooth, but is no doubt expensive to manufacture and, therefore, not cost-efficient for a military rifle when compared with the more typical Mannlicher system. For commercial hunting rifles, such rotary-fed systems are very nice because they are slick but they are totally unnecessary on military rifles. It would have been far better for the designers to have improved the rifle's sights.

Unfortunately, the sights on this rifle consisted of a pyramid front sight with no protective wings and an unprotected V-notch ramp graduated for 200 to 2,000 meters. As is to be expected on such European military rifles, the V notch is quite narrow and shallow, making it very difficult to see the sights properly. As a consequence, my 100-

The Greek 03/14 rifle is smooth, but it has some serious drawbacks.

yard group was 2 7/8 inches. I think the rifle is capable of better, but it is just so hard to see the sights that I could not do it.

The action is smooth, and although the Mannlicher-style action is always slightly slower because of the extra bolt reach necessary to accommodate the bolt location, the good-sized knob and smooth action make up the difference. Interestingly enough, the trigger system had no take-up in the trigger, unlike with most military rifles, and hence the shooter had to exercise greater than normal care when shooting to avoid a discharge before he was ready. The rifle suffers from the standard Mannlicher safety, although the excellent metal fitting on the example tested allowed the safety to be moved off with greater than normal speed. There were no rough spots in the entire space of the safety systems.

The rifle lacks both a cleaning rod and a butt trap, and so maintenance must suffer as a consequence. Recoil is surprisingly heavy for the caliber and weight, although muzzle blast (resulting from the length of barrel) is moderate. Little flash is evident either. Although only 20 rounds were rapidly fired in the rifle, the upper forearm of the rifle got very hot. This is because the barrel is so light the heat is transferred to the wood rapidly. In a bayonet-fighting situation, the shooter must remember this trait, especially in hot environments, or the shooter is likely to find it impossible to find a place to put his weak hand because of the hot surface. The long barrel of the model also makes the rifle ill balanced and unwieldy generally. It is muzzle heavy for off-hand and kneeling shooting. As a consequence, it was quite tiring for me to hold the weapon up; I would begin to shake, and my scores dropped as a result.

Given a choice between the 03/14 rifle and the carbine, I would pick the carbine every time; you can shoot it at the normal effective ranges just as well, and it is much handier in confined spaces. It is pleasant to operate the actions on these Greek rifles, but it is even more enjoyable to hit the target consistently, something that is much easier to do if a proper sight is affixed to the rifle or carbine.

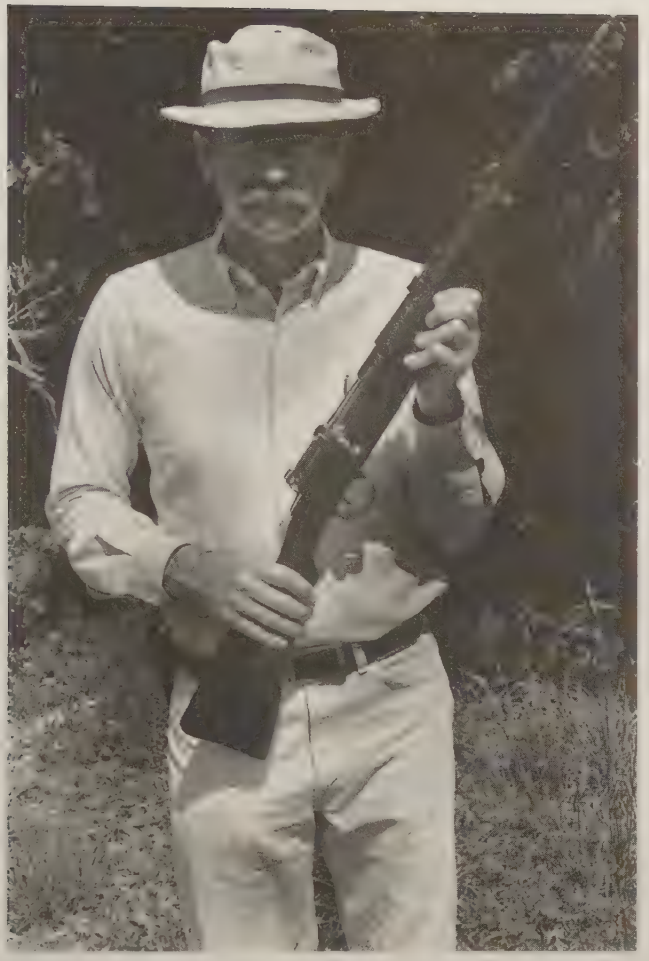
GREEK MANNLICHER SCHÖNAUER 1930 SYSTEM MODEL 03/14—6.5X54MM CARBINE

Even though Greece is not geographically close to Austria, it adopted the 6.5x54mm Mannlicher Schönauer rifle system before World War I. Maybe it was the weapon's and its caliber's popularity in Romania that inspired the Greeks to choose it rather than a Mauser system. Whatever the reason, the Greek military did get a very nice weapon. It may not be as cheap to make as a Mauser, because of the individual machining necessary to get the rotary drum magazine to work, but it is one of the smoothest rifle actions in the world.

The tested weapon was a 20-inch carbine model. Typically, such shortened weapons have more blast and recoil than the rifle version, but I found the recoil to be very light and pleasant. I would rate it at about 10 percent more than the felt recoil of an AR-15A2 rifle using SS109 ammunition. The low recoil, coupled with the very smooth action, allows the shooter to rapidly fire and reload his weapon for follow-up shots.

The action has a very interesting feature: because of the smoothness of the action, once the bolt handle is flipped up, the whole bolt slides back immediately of its own weight. Thus, the speed of fire is enhanced, and the smoothness allows very fast closing to take place. The bolt handle's smooth finish allows it to slide through the hand, thereby increasing the speed in which the action can be worked by a shooter.

The 6.5x54mm cartridge was very popular in the pre-1914 era, and many people have praised its penetration power (which, of course, is due to its fine ballistic coefficient). I have never seen armor-piercing ammunition for the 6.5, but I assume it exists. Regular ammunition is known for its deep wounding characteristics, so I would imagine that



The beautifully machined Greek Mannlicher Schönauer 1930 System Model 03/14 has one of the smoothest rifle actions in the world, is handy to use, and offers excellent penetration.

specially designed ammunition would do even better.

The rear sight is a typical European small V notch; the front sight is a pyramid. Although it is very small and dark, I was able to use it to hit 10-inch plates at 300 yards from the prone position. Dabbing a bit of white paint on the front as well as opening up the rear blade would help a lot, however. The rifle I tested was sighted about 20 inches high at 100 yards, betraying its military history: the theory being that the soldiers aimed at the crotch at 100 yards so no sight adjustment was needed out to 400 yards. I prefer my rifles to hit 3 inches high at 100 yards and then hold over at 300 yards or more, but the military mind of the pre-World War I period apparently was more concerned about long-range work than I am.

Most bolt-action military rifles have safeties that are so slow to disengage that I typically leave them off and simply close the bolt when ready to fire. On the Greek Mannlicher, however, I discovered that you could flick it off with your thumb if it was properly positioned. Because of the shape of the safety and the fitting, I would push with my thumb as I closed my hand around the pistol grip, and the safety would flip over to the off position. I then finished taking my grip and was ready to fire. It is as fast as the Enfield or Japanese rifle. Thus, the safety appears to be similar to that found on the Mauser M93/95/98 series, but it is not because I cannot flip those units off with simple thumb pressure. Instead, I must use my thumb and finger together to turn the winged safety, a much slower proposition. The Greek Mannlicher safety is actually quite fast and would be perfectly suitable for jump shooting in the bush or jungle.

This is a very beautifully machined rifle (which no doubt makes it expensive to make) and is handy to use. The caliber has more than sufficient power, offers excellent penetration, yet still has very light recoil and blast to it. I don't know whether it could have stood up to the abuse of mud in the trenches of World War I, but I suspect that the fine machining would have made it maintenance intensive. It might well have been worth the effort to get the wonderful "feel" that this rifle gives to the shooter.

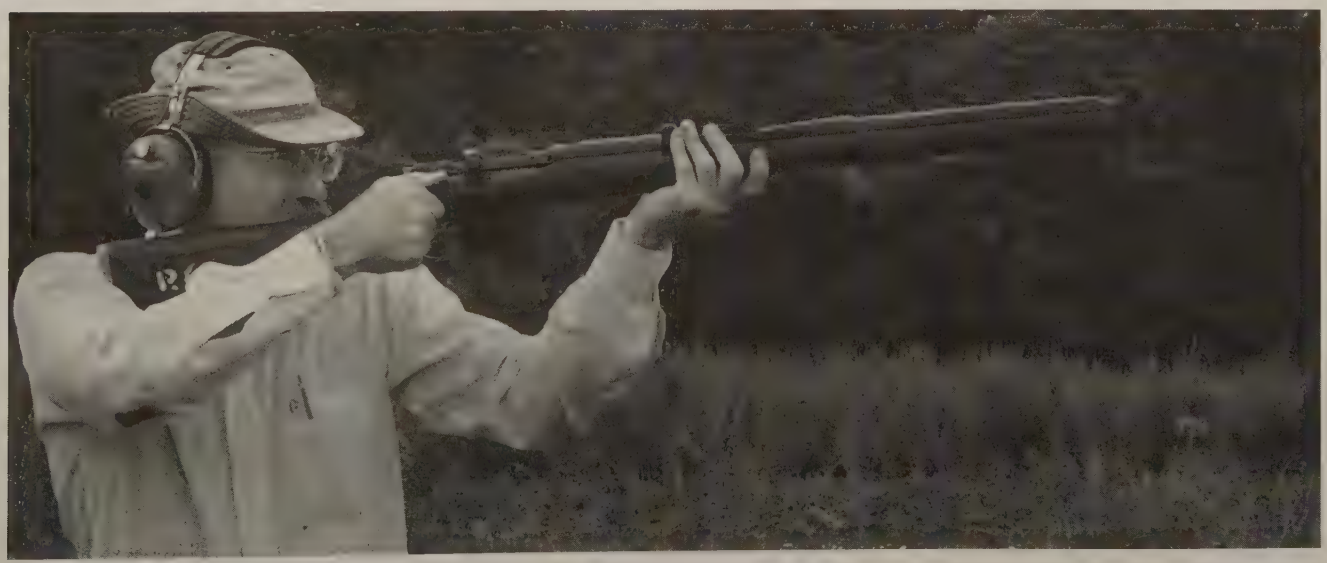
India

INDIAN "ENFIELD"—7.62MM 2A1

This rifle is an interesting combination of new and old technology. The MK III No. 1 Enfield was considered by many to be one of the finest battle rifles to come out of World War I. The British produced the rifle at home but also set up a factory in colonial India where rifles—perhaps a little less well finished than their British cousins but still quite well made—were manufactured.

In the 1920s, the British wanted to produce a new version of the Enfield that was cheaper and easier to make, and they developed what ultimately became the No. 4 rifle. But in India, the MK III continued to be manufactured. Perhaps this was because labor was cheaper than in Britain, the British did not want to spend the money to retool for a new rifle design, or perhaps the military thought "if it's not broke, why fix it?" During World War II, production of the MK III continued at an accelerated pace. It remained the standard service rifle throughout the war. Indian troops fought with the weapon in Europe, Africa, and Asia with great success, repeating their experiences of World War I with the rifle.

Still it seemed to many that the day of the bolt-action service rifle was over at the end of



The Indian-built Isadore 2A2 has all the benefits of a MK III Enfield, but it comes in .308.

The 2A1 that the author tested was made in 1966 in India.

World War II. The postwar Indian army had too much to do and too little time to concern itself with such issues from 1945 to 1948 before independence was granted, and similarly the Indian government had enough to spend its limited resources on without worrying about replacing the service rifle. Still, India did have a big military and at least two serious enemies with which to contend: Pakistan and China. During the 1950s when the British went to their version of the FAL, the Indian army also adopted it. Of course, the Indians wished to manufacture it in India, as they had done with the Enfield, and arranged to do so. Unfortunately, the Indian weapons designers combined various modifications from the Belgian and British designs so that their version was not interchangeable with other models, but the Indian FAL seems to have been well made and to have served the military forces well over a long period and a few wars.

The FAL is more complicated to make than the Enfield MK III and also more difficult to maintain because of its gas system. Additionally, it is more prone to accidental or negligent discharge because of its self-loading action. Apparently in India, there were numerous military formations that were only marginally trained—and perhaps only marginally loyal. Still, they were an important part of the military, if only because they freed up the better trained and more loyal troops for more difficult operations. In the 1960s, the idea of configuring the MK III in .308 was developed to arm just such troops.

Of course, the British had developed a conversion kit for modifying their stocks of No. 4 Enfields to .308, which is a higher-pressure cartridge than the .303. But except for sniping rifles, target shooters, and rare exceptions, this kit was not used because of the expense involved, especially in the days when cheap AK-47 rifles were widely available. Converting the MK III to .308 was not thought possible because of its weaker action.

The Indians overcame this design problem by using a higher quality of steel in their MK III actions. In this way, they could use the tooling and expertise they already had to make MK III Enfield rifles, yet make them chambered for the .308 round, which was standard military issue. This was a clever idea that appears to have been well executed.

The Indian MK III .308 tested by me, marked "7.62mm 2A1" on the receiver grip, was made in 1966. At first blush, it looked like a standard Mark III, but a closer examination showed some interesting changes. The magazine is different and squarer in shape, rather than angled like the .303 version. It would have been clever for the Indians to have designed their Enfield to take the FAL magazine, but apparently that was too much to hope for. The magazine does detach readily, but it does not appear possible to fit the higher-capacity FAL magazine to the rifle.

The sights are standard for the MK III, which means a very small notch and thin front sight difficult to center and see. Unlike the MK III sight leaf that is graduated out to a range in excess of 2,000 yards, the Indian 7.62mm 2A1 is only graduated to 800 meters. Of course, the remaining half of the slide is blank, but 800 meters should be more than adequate for any use of the rifle—unless long-range work over the dusty Indian plains is contemplated. I assume that nowadays this work is handled by the tripod-mounted 7.62mm machine gun, however.

Other than these changes, the rifle is very similar to its .303 cousin. Recoil seems slightly sharper than in the .303 version, but you would have to shoot them side by side to really notice the difference. As with any MK III, its ability to be fired with the bolt operating readily from the shoulder makes for a very rapid firing bolt-action rifle. The safety can be flipped over and applied quickly, a very nice feature. If you have spare magazines, it can be rapidly reloaded, or you can feed it stripper clips for quick reloading.

The barrel on the Enfield MK III is thin, and it appears that the 7.62mm version is equally thin. About 30 rounds fired rapidly through the weapon heated the forearm so much that it became uncomfortable to hold. I imagine that it could be a problem in tropical India or similar climes, but since I have not heard of anyone voicing such a complaint (except me), perhaps this is not as much a real-life problem as it is a range problem.

Overall, I found the 7.62mm 2A1 rather charming. It permits a person to shoot his MK III Enfield inexpensively by using widely available .308 ammunition. Although the sights are difficult to see, an A.J. Parker peep unit can be fitted, and greatly enhancing performance on target. Last, merely holding the rifle in your hand allows your mind to be transported to a time and place where wild and woolly tribesmen were given such weapons to use because their acquaintance with more modern designs was questionable—as was their loyalty to a central government. Images of the tribes of the Northwest Frontier immediately fill the mind if you are at all interested in that period of history.

Iran

IRANIAN MODEL 1930—7.92X57MM

This little carbine is one of those cute little weapons that are so much fun to handle and convenient to carry, but become less appealing when they are actually fired. The first ones were made in Czechoslovakia before World War II, and they were later produced on German machines with European technical help at Iranian arsenals.

This carbine has an 18-inch barrel and, naturally, has a lot of muzzle blast and, with some lots of ammunition, considerable flash. Blast and flash combine to make it appear to have more recoil than other 8mm rifles, but this is not the case.

The rear sight is a narrow V-shaped notch, whereas the front sight is a pyramid type. The front sight is well protected from damage; the rear sight is not. The weapon does not have a butt trap, but it does have a cleaning rod slung under the barrel. Oddly enough, this version has no bolt-hold-open device, although most rifles made by 1930 did incorporate this feature.

The bolt handle is flat on the bottom to

The author has just fired the Iranian Mauser carbine. The recoil felt heavy (although, obviously, it was not) because the short barrel produces a heavy blast.

allow it to fit closer to the stock and is checkered on the flat side. Although this permits it to be flatter against the stock, which is useful for cavalry troops, the bolt handle cannot be used as quickly as a rounded butt handle because it will not slip into the palm of the hand, the key to rapid bolt manipulation.

The safety is the typically slow Mauser wing safety, and the trigger is the two-stage type. Oddly enough, on the test example, it was very light and much better than the triggers commonly installed on factory sporter rifles today.

The rifle is of a very handy length, but I found it quite muzzle heavy. This type of muzzle heaviness always makes off-hand and kneeling shooting more difficult, although in this case the short overall length of the weapon minimized the muzzle heaviness.

I always like short-barreled, rifle-powered carbines, but I must say this Model 1930 is not as handy as the M95 Spanish carbine or M94 Swedish carbine. Both of them are lighter and easier to operate with speed. Although no Mauser rifle with a narrow V-notch rear and pyramid sights will ever be easy to shoot quickly in dim light, both of those carbines are better than this weapon. The Iranian Model 1930 needs better balance, a better bolt, and better sights (like those found on the MAS1936). If these corrections had been incorporated in the original design, the Iranians would have had a much better weapon.

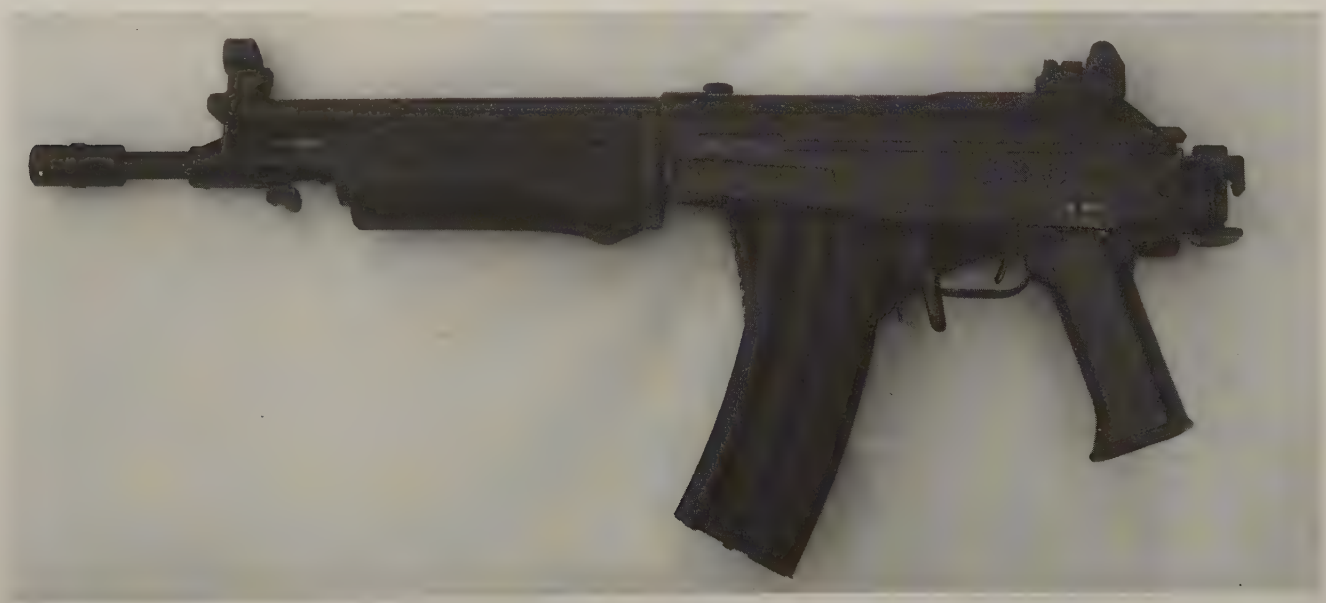
Israel

GALIL .223/.308

One of the things that Israel learned after the 1973 Yom Kippur War was that its FN-FAL rifles were not good battle rifles for desert fighting: they were sensitive to sand and too long for use in armored vehicles. Further, the Uzi SMG was too low in power. Why the Israelis had not adopted the design modifications developed by the British to adapt the L1A1 to a sandy environment is unknown.

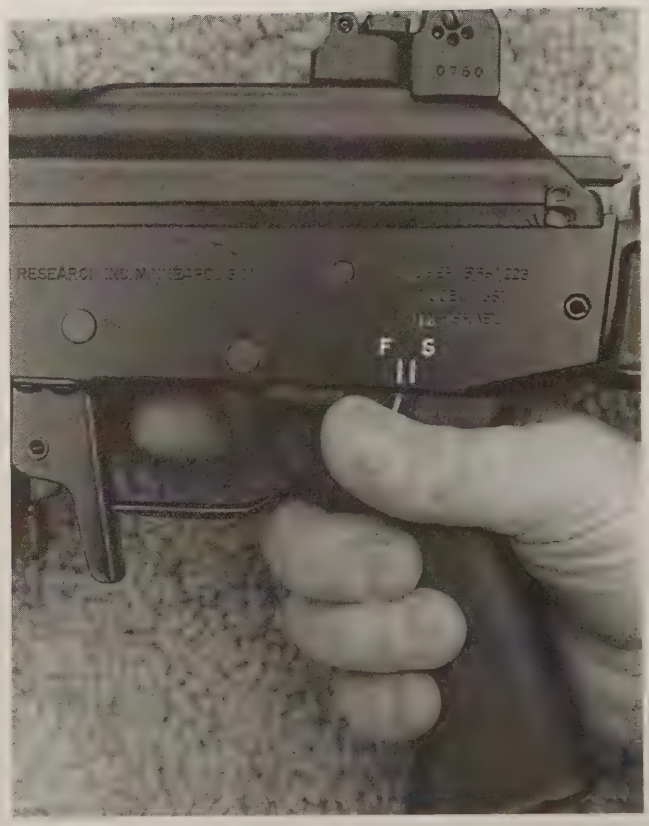
On the other hand, the Arab armies fielded the AK-47 rifle at that time, and having been on the receiving end of this superb weapon, the Israelis soldiers were greatly impressed with it. The Israeli military allegedly wanted to adopt the AK-47, but Israel's major ally was not in Moscow but in Washington, D.C. Thus, the 7.62x39mm cartridge was out, and the 5.56x45mm was in.

The first Galil rifles were made from the Finnish Valmet receiver mated to Stoner barrels. The early guns were given to the Golan Brigade to destroy. Naturally, it destroyed them. But it destroyed everything else before the AK-47s and Galils were



The Galil SAR 5.56mm rifle with 13 1/2-inch barrel. Israel developed the Galil after the 1973 Yom Kippur War revealed that the FN-FAL was not suitable for desert fighting.

The excellent cocking handle design of the Galil is evident in this photo. The shooter can cock with the weak hand while the strong hand remains in the firing position at all times.



The safety is much better on the semiautomatic version because the thumb only has to push it forward to fire. On the selective-fire version, the shooter must pull back to fire, and back even farther for full auto.

destroyed. Israel had its new infantry rifle.

The Galil might be viewed as the finest AK-47 ever made. It uses a solid machined receiver, which supposedly helps with prolonged use as a squad automatic weapon. I do not think that any light infantry rifle can substitute for a squad LMG, but the Galil will hold up as long or longer than most: 60,000 rounds or more is the common figure bandied about for the lifetime of the rifle. Obviously, this is only critical for a training command rifle—a standard infantry rifle is unlikely to ever fire that many rounds. I have put perhaps 5,000 rounds through my .223 and .308 Galil rifles and see no signs of any wear. The downside to the machined receiver and the smaller bore is that the Galil .223 rifle is heavy for that caliber. Although an earlier AR-15 (M16) weighs 6 1/2 pounds, the Galil goes 9 pounds or a little over. I have a problem with a .223 rifle that weighs more than a .308.

The sights on the Galil are superior to those found on any other AK-47-type rifle. The rear sight is an adjustable peep with night-sight capability, and the front is a protected post also with night-sight capability. The bolt handle is shaped to allow either hand quick access. Many designers would do well to steal that idea. The stock is not particularly comfortable to shoot with, but it folds easily, opens even faster, and is rock steady. I prefer the wood stock, but I seem to be the only person in the world who does. If you deliver your troops in armored vehicles or helicopters (as the Israelis do), the folding stock makes sense. But if you walk to your target, then the wood stock is better. Fortunately, it is available.

The folding stock unit on the Galil is well thought out and quick to put into action. Folding the stock is more involved than unfolding it, but—since time is more critical when you are unfolding it—this is not a major drawback.

The safety system on the Galil is much better than on the standard AK-47. You still can remove the safety from the right side as you do with an AK-47, but there is also a pistol-grip-mounted safety that can be flipped off with thumb pressure. It is loud when removed—like the safety on any AK-47—but at least it is a lot faster. You can do snapshots with the safety once you break it in a little.

The magazines on the Galil rock in and are released just like the AK-47 magazines, unless you use the M16 magazine adaptor. Unfortunately, I found that the adaptor was an extremely tight fit, so inserting the magazines was difficult, and withdrawal even more so. Galil magazines are very sturdy but, being made of steel, are considerably heavier than the aluminum M16 magazines.

The pistol grip on the Galil is very comfortable and allows good control of the weapon. Unfortunately, it does not contain any cleaning gear, as does the FAL grip, nor do you get such gear in the stock. I view this as a serious failure because having such material with the rifle tends to lead to better maintenance.

The forearm comes in two distinct styles: the standard rifle group and the heavier squad auto with bipod unit. I prefer the rifle forearm myself. Both have heat deflectors in them, are open at the top to allow the heat to escape, and will allow a fairly large number of rounds to be fired in rapid succession before the weapon gets too hot to hold.

The flash hider on the Galil, which seems to work well enough in that role, is also used as

grenade launcher. I have never shot any grenades off my Galil rifles so cannot comment about this feature. Frankly, I have always had grave doubts about the efficiency of rifle grenades—at least since the introduction of the 40mm grenade launcher. Perhaps some of the antitank grenades make sense, although I still think a LAW rocket is better.

The worst two features on the Galil are the trigger design and weight. For some reason, the trigger is so straight that it tends to hit my finger and hurt it. When it is cold, the problem is so grave that a firing off a magazine will leave my already cold fingers stinging and throbbing. Weight is also a major problem. The Galil 5.56mm rifles simply weigh too much. When you approach 10 pounds for a 5.56mm rifle, I begin thinking about better weapons to carry to the field. With that in mind, you may wish to consider the Galil 7.62x51mm NATO rifle. This rifle is available from IMI and has encountered limited military and police sales worldwide. Specially equipped with short barrel at 15 inches in the SAR configuration, this rifle is lighter than the 5.56mm version, yet gives us all of the accuracy and durability of the smaller-calibered version. I must say that I view the SAR Galil in .308 as possibly the ultimate AK-47. It has all of the AK-47's fine reliability along with sights that allow you to get good shooting results more easily and permit you to shoot a 7.62x51mm NATO round, which is a better cartridge even in the shorter SAR barrel length than any 7.62x39mm ammunition.

Italy

VETTERLI-VITALI MODEL 1871/87—10.4MM

This modification of an original Swiss design was adopted to meet the needs of the Italian army shortly after Italy was reunited in 1861. Originally, a single-shot design, the rifle was modified in 1887 to use a three-shot magazine, and this is what I tested in 10.4mm Italian caliber.

People tend to think that these old-time rifles are obsolete and underpowered. This rifle is not underpowered: it shoots a 10.4mm bullet (about .41), weighing 313 grains at 1,430 fps—this is rather like a heavy .44 Magnum load. I killed a 2,200-pound bison with a 330-grain bullet at 1,200 fps in an M29 Smith and Wesson 4-inch barrel, and the bullet went completely through the animal side to side. Therefore, I

Off-hand shooting with the M1871/87 revealed poor sights but a surprisingly good trigger.

do not doubt that as long as vital parts are hit, anyone hit with a bullet from this weapon is likely to be completely penetrated and taken out of action.

This is a long rifle: 54 inches overall with a 34-inch barrel. Long barrels burn black powder more efficiently. Its length makes the rifle unwieldy, but its barrel diameter kept the rifle from being muzzle heavy. Therefore, shooting from both the off-hand and kneeling positions could be done properly.

The action is smooth, and it has a very light trigger pull. There is no two-stage take-up that many of us have come to expect in military rifles. As a result of the light pull, off-hand work is much easier than is commonly the case, but the shooter must exercise care, lest he fire the weapon prematurely. There is no practical safety on the rifle; instead, a decocking system is used. I would be reluctant to use it because of the possibility of the weapon's being dropped and the firing pin run forward, thus discharging a round accidentally. The best bet would be to leave the bolt slightly ajar and close it when ready to fire. Of course, I do that with Mauser actions also.

The rifle has no upper handguard. Because of the low heat generated with black-powder ammunition and the limited number of rounds fired, I suppose this is not a problem, but I like upper handguards—if only to keep the barrel from getting hot when the sun is baking down on it. You would think that the use of this rifle in sunny Italy and its African colonies would have pointed out this design flaw rather quickly. Starting with the M1891 Carcano, all subsequent Italian rifles had upper handguards to protect the shooter.

When in the down position, the rear sight is set for 275 meters; when raised, it is graduated from 400 to 1,800 meters. It is unprotected by wings and so is subject to being damaged. The front sight is a pyramid type located off center, I suppose, to compensate for drift; as with the rear sight, it is unprotected from jarring and damage. The rear sight is a deep V notch, and the front sight is dark. It is very difficult to distinguish the sight, making it difficult to use. The sighting for a minimum of 275 meters means that at all practical ranges, the shooter is likely to shoot over the target unless he aims at the knees—the 10.4 cartridge, while as powerful as a heavily loaded .44 Magnum, also has its trajectory, resulting in rounds hitting very high at 100 yards when sighted for 275 meters.

The M1871 has a magazine cutoff. When the cutoff is in the "on" position (as shown here), the weapon can be used as a single loader, thereby saving the contents of the three-shot magazine for emergencies.

The Model 1871/87 has an additional three-shot magazine, making a four-shot weapon if the round in the chamber is included. A magazine cutoff was included so the shooter could keep the contents of the magazine ready for an emergency. The rounds have to be inserted manually because the magazine does not take clips or charges.

By 1891, the Italians were starting to issue Carcano rifles in 6.5mm, so these large, black-powder Model 1871/87s were made obsolete relatively quickly. However, a lot of them apparently were made, and they were seen during World Wars I and II in the hands of the less well-trained troops or colonial levies. By World War II, many of those rifles encountered had been rebarreled to 6.5mm, but that did not make the weapons less bulky or more convenient to use. When you consider that by the time this rifle was released, the French had their M1886 eight-shot tube repeater and Belgium was only two years away from the first Mauser to appear in the hands of European armies, it becomes apparent that this was only a stopgap weapon designed to improve the performance of the single-shot M1871 with a minimum of expense and time. At one time, these rifles were common, and I do not think they have become rare now. It is simply that they have such low value that people who bought them for $9.95 in 1963 are not inclined to plow through all of their effects to find a $20 rifle now.

M91 6.5MM ITALIAN CARCANO RIFLE

This is a very long rifle, and at first glance, you would think it was ill balanced. Interestingly enough, it is not, and shooting it off-hand or kneeling is easy because the barrel, while long, is light. The long barrel and rifle weight produce very little recoil or muzzle blast. I frequently shoot short-barreled rifles in .308, so I am always pleasantly surprised to discover how nice rifles like this are to fire. You do not feel as if you are in a boxing match, and yet you know you are shooting a real cartridge, not a mere rimfire or pistol cartridge fired out of a rifle.

On the example I tested, the trigger pull had a lot of slack and was gritty. This rather surprised me because the M91 rifle was made in 1935, before the demands of World War II were felt, and was in virtually new condition.

The safety is the same as that found on the M91 carbine. If you learn how to use it properly, it is actually quite fast and effective. If you do not learn how, or treat it like the safety on a traditional U.S. rifle, you will be cursing it and thinking the Italians do not understand how rifles are used. They do

The M91 Carcano Rifle in 6.5mm appears long, but it balances nicely and is easy to shoot from the off-hand or kneeling position.

This Italian soldier is wearing a gas mask and carrying the M91 Carcano rifle during World War II.

understand—you just need to understand how to use *this* rifle action. The action on the test rifle was stiff, but that may have been a function of its new condition, because the M91 carbine was quite slick. No M91 Mannlicher-style bolt action will be as fast as a good straight pull, of course, but a well-broken-in M91 Carcano can be fired quite rapidly. If you doubt me, review Lee Harvey Oswald's alleged performance in 1963.

The rifle has the standard adjustable rear sight that had been deleted as a wartime savings measure on the M91 carbine tested. All I can say is that I like the fixed carbine sight much better. The front sight of the M91 rifle is a standard European pyramid style, and the rear is a deep V. There is the standard battle sight plus the adjustable unit. To use the battle sight, you flip the adjustable sight up and over so it rests upside down on the barrel. The battle sight is a deep V, and holding elevation is difficult—as is seeing the front sight, given its pyramid appearance. Further, it is sighted for 300 meters. This means you have to shoot at the knees at 100 yards, rather than dead on. If you flip the adjustable sight over, you will find the lowest setting is 600 meters and the highest 2,000 meters. Unfortunately, it is not windage adjustable, except for the front sight, which would be hammered from side to side in the slot. If anyone were serious about shooting at such extended ranges, it would seem to me that he would want to be able to correct for windage in the rear sight. I rather

doubt that anyone ever used the 2,000-meter sight on an M91 Carcano rifle to intentionally hit anything.

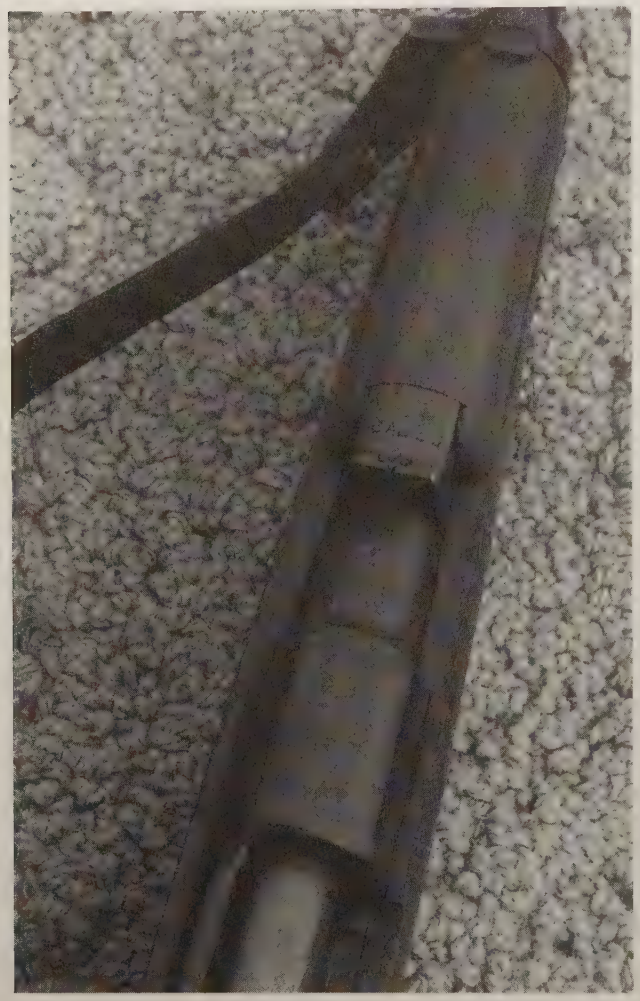
The M91 carbine is light, handy, and very pleasant to shoot. The M91 rifle, though pleasant to shoot, is more difficult to shoot accurately as a combat rifle than the fixed-sight carbine. However, the rifle is not muzzle heavy, and if the shooter does his part, he can hit a 10-inch metal plate at 300 yards easily enough while he is kneeling. More practical sights would have made this a much better rifle. It is a shame that only when resources were really pressed did people discover this.

M91 6.5MM CARCANO CARBINE WITH INTEGRAL BAYONET (FIXED SIGHTS)

Most rifle people sneer at the Italian 6.5 carbine, especially the model with the fixed rear sight, and I must say my original view was similar. However, when I picked it up and started handling it, I realized that it was actually quite a handy piece of equipment. Perhaps the Italian war record, as well as the low price of the carbine, had prejudiced us against this firearm. The situation was rather like that of the Webley MK VI revolver, which though decried by many, turned out to be one of the finest combat revolvers ever made. I cannot say that for the M91 carbine, but I will say that it is actually much better than I would have anticipated. Further, the more I shot it and became familiar with it, the better I liked it—always a good sign with either weapons or people.

My test group at 100 yards went into 3 1/4 inches, which is not great but is as good as any other standard military rifle of the period can be expected to achieve. Any better results would be exceptional not standard. Unfortunately, it was hitting about 12 inches high, indicating that even with the fixed rear sight the weapon was sighted for 300 meters. Why Europeans do this is simply beyond me. A few inches high at 100 would be plenty and still allow the shooter to engage man-targets at 300 meters by holding dead on. As it is, you must aim low at 100 yards, or you will shoot over the target. Such "battle sights" are the result of too many misses at close range, and the likelihood of hitting targets goes down as range goes up. The emphasis should more properly be on close-range fast work, even for the battle rifle. My carbine shot 1 1/2 inches to the right, but, of course, that may have

The M91 carbine turned out to be a real surprise of a weapon. It was effective, handy, and easy to use.



The fixed rear sight on to M91 carbine was an excellent practical sight. In fact, it is the fixed sight, which many attribute to an emergency wartime measure, that makes the carbine a much better battle weapon than the Carcano rifle.

been me and not the carbine. Adjustments to the sights can be made only by filing or pounding, but you could do it if needs be. Certainly, I would have done so were it my battle rifle.

The recoil of the 6.5mm Italian cartridge was quite light even in this very light carbine. Yet as a result of the bullet's weight, size, shape, and subsequent ballistic coefficient, the cartridge offers good penetration. The 6.5 Italian is very close to the 6.5x54mm cartridge or 6.5x55mm Swedish, and those calibers are known for good stopping power on animals. In Missouri back in 1962, I saw a 6.5 Italian rifle dispatch the biggest white-tail deer I have ever seen with great efficiency. I have no reason to believe that it would not do as well on a man. Of course, the most famous alleged shooter of the 6.5 Italian cartridge, Lee Harvey Oswald, found that it did the job just as well as any .30-06 or .300 Magnum would have.

The 6.5 Italian rifles all use stripper clips inserted into the rifle action. When the last round is chambered, the empty clip falls through the magazine slot to the ground. This makes for a very rapid reloading method as well as a very handy way to carry spare ammunition. Of course, it precludes your topping up your weapon during a pause in the action (much like the M1 Garand); it requires you to have special clips or you merely have a single loader; and the clips falling out always make noise leaving the rifle, disclosing your location to the enemy. I prefer detachable magazines.

The trigger on the test example had the typical double pull of a military rifle, and the trigger's final pull was quite gritty. Still, I found that I was able to hit my 10-inch metal plate at both 200 and 300 yards quite easily from the kneeling position, and I hit easily the 100-yard plate shot from the off-hand position. The sights actually reminded me of those found on handguns and, in actual use, were quite good (and as I mentioned in preceding section much better than the adjustable sights on the Carcano rifle).

The carbine stock contained a butt trap for cleaning equipment, which is always a nice feature on military rifles. The bayonet was a "sticker" rather than a "slasher," and had I been an Italian soldier who carried it in war, I probably would have removed it to save weight. But perhaps it made a handy tool for roasting sausages over an open fire. I prefer bayonets with an edge that can be sharpened so you can use them as a knife, but some people prefer spike bayonets because "they are easier to withdraw from human bodies." I was always taught to merely shoot the bayonet out, but opinions will differ. Other than myself, I know of no one who actually

stabbed anyone with a bayonet while in the military, but perhaps my circle of acquaintances is too limited.

The action on the rifle is very fast, and the bolt handle is properly designed to allow rapid reloading. The safety at first blush seems hard to engage or (more critically) to disengage. However, a little experimentation shows that the way to use it is to place your hand on the side of the weapon, not around the grip. If you do that, your thumb will be straighter and have sufficient pressure to push in the lever against the bolt spring. Once you practice a bit, you can flip it on or off very rapidly and then take up your firing grip. If you try to flip it off with your thumb while holding the grip (as you would with an M1914/17 Enfield or similar rifle), you will find it very slow if not impossible. Done properly, it is actually quite fast, and I prefer it to the M98 Mauser-type safety. It also seems quite rugged and certain in operation, which is always a good point. Certainly, it is light-years ahead of the Mosin-Nagant M91 series of safeties.

I was very favorably impressed with the M91 Carcano carbine. It is very light and handy to carry and use. It is easy to shoot in the off-hand, kneeling, and sitting positions. It offers light recoil with plenty of power to stop assailants. These weapons are too frequently ignored because of mindless prejudice. Try one and you might find it much better than you imagined. I certainly prefer it to an M1903 Springfield rifle in .30-06, and many bolt-action fans seem to think that the Springfield Armory is located in a wing of Heaven. But then those people have probably not fired an M91 carbine, at least not with an open mind.

M91 ITALIAN 6.5MM CARBINE WITHOUT INTEGRAL BAYONET (ADJUSTABLE SIGHTS)

The Italian army had a wide variety of carbine models available. The one I tested was made in 1915 and was in practically new condition. The wood was perfect, as was the bore. Even the bolt still showed signs of the careful finish applied to it. The weapon was exactly as it would have been had I been an Italian soldier issued it in 1915. The late-war M91 carbines with integral bayonet and fixed sights (discussed in the previous section) are frequently shunned by people, yet when I tested it I found it to be a real combat weapon. Therefore, I approached this weapon with great eagerness and hope.

This weapon is very handy and has a nice balance for off-hand and kneeling shooting. The weapon has a fairly sharp recoil, especially in comparison with the rifle version, and is also quite noisy as a result of the shortened barrel. However, such things really matter little in the field if the weapon is otherwise suitable; essentially, they are only firing range concerns.

This model lacks a butt trap cleaning kit, but it does have a cleaning rod under the barrel, which is a partial nod to maintenance. The bolt works smoothly, and even though the trigger is no better than on any other M91 rifle tested—it is somewhat heavy after a long take-up—it is certainly usable.

The safety is the same as that found on all Mannlicher M91 rifles, which is fast to use once it is broken in, if you know how to use it, but very slow if you persist in using it the way many people do when confronted with the safety. Mastering the safety is one of the keys to appreciating the M91 as a combat weapon, although I admit that I tend not to depend on them with bolt-action rifles, preferring to leave the bolt handle up and quickly push it closed when I'm ready to fire. Perhaps my ancestors were French ordnance designers.

Unlike the other M91 carbine tested, which is fitted with a one-position, fixed sight, this carbine is fitted with the typical pyramid front sight and adjustable V-slot rear, which is adjustable to 1,500 meters on this carbine. The V slot is very deep but has very steep sides, which makes it difficult to pick up targets and get the proper sight picture. It is

especially difficult to do this as it gets darker because the steep sides block so much of the target view. Additionally, like the rifles fitted with similar sights, the lowest sight setting still places bullets 22 inches above the point of aim at 100 yards, betraying a battle zero of 400 meters. For a carbine like this, such a zero is nearly worthless. On the other hand, the battle-improved M91 with fixed sight is zeroed so that it is usable at true combat ranges of 300 meters or less by holding directly on the point on the target the shooter wishes to hit. No aiming at the knees is necessary with that variation.

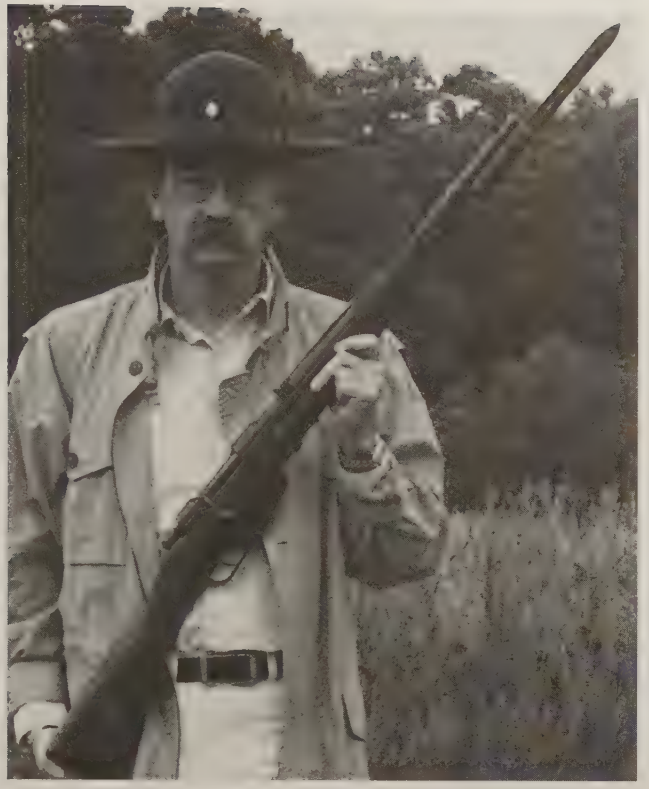
The author likes the fact that this M91 carbine has a cleaning rod, but he prefers the fixed-sight M91 carbine for practical purposes. However, this adjustable-sight carbine is much handier to use than the M91 rifle because of its superior balance and general handiness.

Sling swivels are available on both the bottom and the side of the rifle, allowing the soldier to carry the weapon conveniently over his shoulder or across his back. This was done because this carbine was as likely to be issued to infantry support troops as it was to cavalry troopers. Neither swivel actually pivots, which is fine with me because it avoids having to tape the swivels down to avoid their making noise on patrol. In fact, this rifle would pass the jump test easily, except for the cleaning rod that tended to rattle a bit. A bit of tape around it would likely remove the rattle. A rubber washer on such things would be nice, however, and show a little concern for the infantryman by the weapon designers.

This carbine has a lot of pluses: it is light and handy to carry; it is short enough to be easy to use around houses, vehicles, or trenches; the action is good; the trigger is fine; the safety is adequate; the accuracy is inherently good; and the power level is better than what is commonly issued today. However, the poor sights and the actual sighting of the sights make this otherwise nice carbine a relatively worthless battle instrument.

CARBINE M1938 TS—7.35MM M1938 CARBINE

In the 1930s, apparently both Italy and Japan decided that their 6.5mm caliber rifles were too light and decided to switch to larger calibers. In Italy, the change was to the 7.35mm cartridge. But with the war in Europe starting, it was unrealistic for Italy to change calibers in midstream, so the 7.35 rifles really got little battle exposure. Apparently, most of these weapons were apparently sold to Finland, which was friendly toward the Axis, if for no other reason than the Axis opposed the Soviet Union, which had invaded Finland in 1940. The Finns, being short of weapons, bought the 7.35 Italian rifles and used them



The M1938 7.35mm carbine is essentially the 6.5mm reconfigured for the 7.35mm cartridge. Because it was developed just before World War II started, the Italians did not want to change calibers, so they sold most of the weapons to Finland.

for noncritical roles. In fact, one of the examples I tested was stamped as former property of the Finnish army.

These rifles are essentially caliber alterations of already existing 6.5mm M91 designs. The only real difference I could detect was that the barrels and stocks were a little thicker. As a consequence, the carbines in 7.35mm did not feel as nimble in my hands as the 6.5mm did, thus rather diminishing their handiness in my judgment.

Both of these models use blade-type front sights, which are much better than the pyramid-type units fitted to the early M91 rifles, and fixed rear sights. Unfortunately, these 7.35mm versions use narrow V-shaped rear notches unlike the square-sided and bottom notch found on the M91 carbine previously tested with a similar front sight. As a consequence, the ability to hold elevation and windage is diminished. The fixed rear on the M91 carbine is one of the best European open sights I tested, whereas the rear sights here are no better than the adjustable units tested on the earlier examples of M91 rifles. At least the front sights are better, with a square-faced blade.

Both rifles lack a cleaning rod under the barrel but do contain a butt trap for cleaning gear. Neither the front nor rear sight on either example is protected against blows, which is odd, in my opinion. Both are a handy length and fairly light, although not as light as the 6.5mm examples.

Both of these rifles are fitted with folding bayonets. On the M38 6.5mm, it is a folding-spike-type, on the M38 it is a rather interesting blade unit. The M38 TS bayonet can easily be removed and used as a knife, but on the M38 spike bayonet cannot be used as a slasher. Unfortunately, both bayonets rattle quite a bit, and I imagine that all Italian (or Finnish) soldiers who were issued these rifles figured out ways to silence the rattles with tape or cloth bindings—otherwise they could have been heard for hundreds of yards. The spike bayonet is lighter and does not make the carbine muzzle heavy, whereas the blade unit found on the M38 TS does. It can be removed rapidly, however, and then the muzzle heaviness is gone. I would remove both if I were issued either rifle because I think they simply add unnecessary weight, reducing the weapon's efficiency. Both weapons are of a good length, and once the muzzle heaviness is gone they are pleasant to use in off-hand or kneeling positions.

Interestingly enough, both of the tested carbines had very unusual trigger pulls. There is a small amount of take-up, but once that is done, the remaining trigger pull broke like a glass rod and was not more than 3 pounds. In fact, it is rather like a set trigger system. Pull up the slack and you rather "set" it. Then the merest touch would fire the weapon. Whether this is common to all such 7.35mm Italian

rifles and carbines, I do not know, but the two I tested had this feature. I believe it is a dangerous trigger pull because it is far too light for the rough and tumble of combat. Such triggers might be acceptable in a match rifle but not in a combat rifle. I had a number of shots go off before I was ready to fire, and I think it is very hazardous to have such trigger pulls on a combat rifle. Carefully test any 7.35mm rifle you encounter and check the pull by dry-firing to see if this is standard throughout the run of weapons.

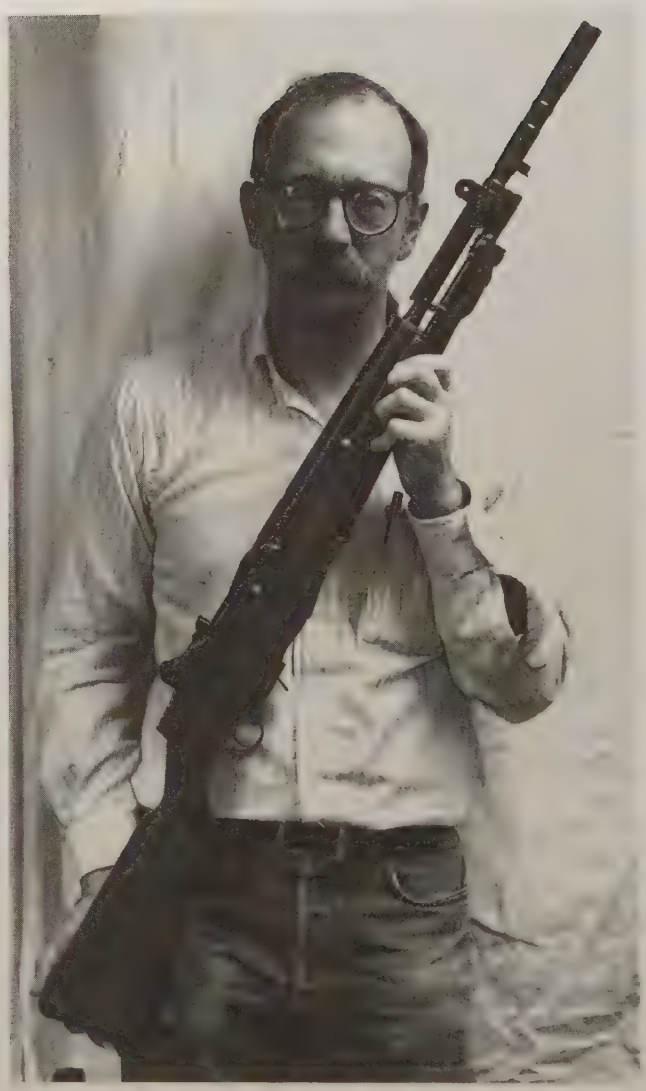
Why the Italians decided to go to a larger caliber is a mystery to me. Perhaps their machine guns lacked range. But a better idea would have been to develop either better, more ranging ammunition for their machine guns or even a different caliber, but not to change all infantry rifle calibers too. These 7.35mm rifles are very little different from their 6.5mm brethren, except they feel thicker and heavier and are accordingly less handy to use. All other aspects are the same, and I would prefer the 6.5mm version myself—even if the ammunition supply was equal.

M59 BERETTA

At the end of World War II, the Italian military was equipped with a hodgepodge of various arms. Because the United States considered Italy important to the campaign to halt the spread of Communism in Europe, the United States decided to gave M1 Garand rifles to the Italian military. Later, the Beretta factory was set up to manufacture the rifles in Italy, and many fine examples were turned out.

When the United States adopted the M14 rifle—itself a development of the M1 Garand—Italy decided that rather than adopting the M14, the M1 would be modified to fire bursts, to take the new 7.62x51mm round, and to weigh less. The result was the M59 Beretta.

The M59 offers an integral grenade launcher that also serves as a muzzle break for recoil reduction, especially important with burst-firing on shoulder-fired weapons.



The Beretta M59 may be viewed as an Italian M14, with special emphasis on its use in burst-fire mode and with rifle grenades.

Interestingly enough, I have been told that Italian mountain troops ski with a grenade in place, the idea being to fire the grenade and start snow moving if they are ambushed and to give them an opportunity to seek shelter. True or not, it sounds like a good idea, although I wonder how frequently the grenades fail to explode when hitting soft snow.

The sights on the Beretta M59 are similar to those on the M1 Garand and are very good. The front is a well-protected blade, and the rear is a good-sized peep with sufficient

The M59 has a standard winter trigger, which is deployed in this photo.

protection to preclude movement by slamming the weapon.

The safety is centrally located and quick to remove by either hand. Although the trigger guard does not fold down, there is a winter trigger fitted, which is a screw-on addition to the M1/M14 rifle but a standard item on the M59. It reminds me of the STG 57 rifles—perhaps the Italians saw a Swiss rifle first.

The selector is located on the side of the rifle and clearly is not designed for rapid use. The soldier is supposed to select his mode of fire and keep it there until it is obvious that something else is necessary. You must break your shooting grip to change the mode of fire. Exactly why they even bothered to include full-auto fire is a mystery to me: shoulder-fired full-auto fire with weapons chambered for 7.62x51mm ammunition is clearly not very effective. Fast semiauto fire always gets more hits on target, and it is this way on the M59 as well. On full auto, the weapon jumps so much that the cone of fire is excessive except at very close range. On semiauto, the muzzle break appears to help, but the blast is increased and dirt/dust is blown up because of its operation.

The M59 offers the cocking handle on the right side, which, of course, means that you must break your firing grip to cock it. Had it been angled upward like that found on the Galil, it would be possible to cock it with the left hand. At least you can kick it open to clear rounds with your foot, something not possible with the M16A1/2 rifle. The magazine release is centrally located and fairly quick to use although it must be rocked into position, not simply jammed into the magazine well.

The M59 is produced using methods and material that were common in 1936, when the M1 Garand was adopted, but which are rather time consuming today. Additionally, the wood stock is subject to warping. I have seen wood stocks on M14 rifles that had swollen so much from rain they could not be removed from the action. I assume that M59 stocks would suffer from the same drawback. Clearly, fiberglass or Kevlar is a better material to use on combat rifle stocks.

Accuracy on the M59 when fired on

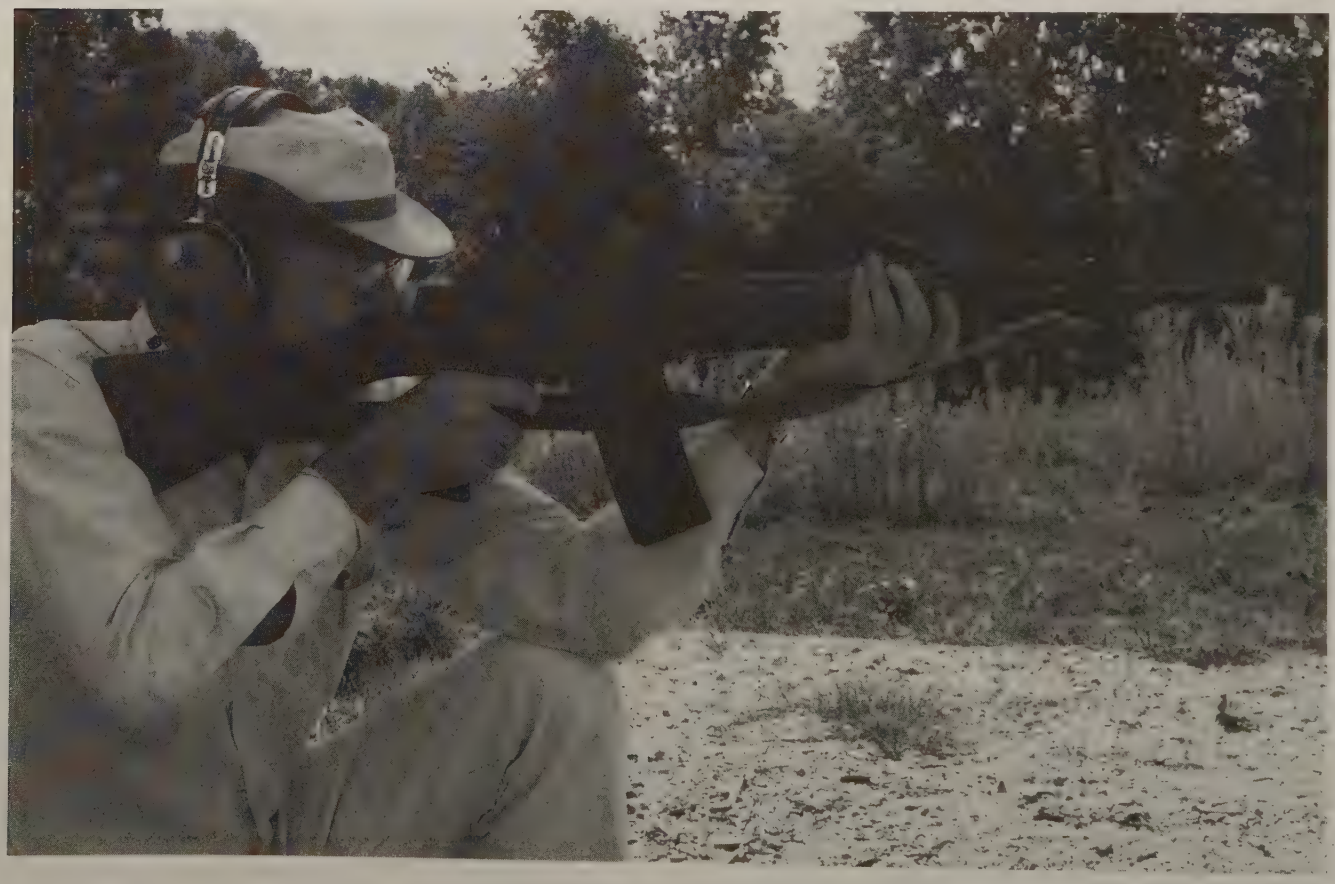
semiautomatic is about like that of the M14: 2 inches at 100 yards, absent refinement of the weapon and ammunition.

Possibly the best way of viewing the M59 is to view it as an Italian M14, placing great emphasis on using the weapon in the burst-fire mode and with rifle grenades. Faced with choosing a 7.62x51mm rifle to arm its troops in the 1950s, and already armed with the M1 Garand, the Italians could look to FN for their FAL or Germany for its G3, or produce a homegrown modification of a rifle already in production with an action familiar to its soldiers, which was very similar to that of its benefactor, the U.S. Army. They chose the latter option, and the result was the M59. Having duly noted my reservations about the M59, I believe that, overall, it is a good, user-friendly rifle, although it may not be as rugged as H &K's G3.

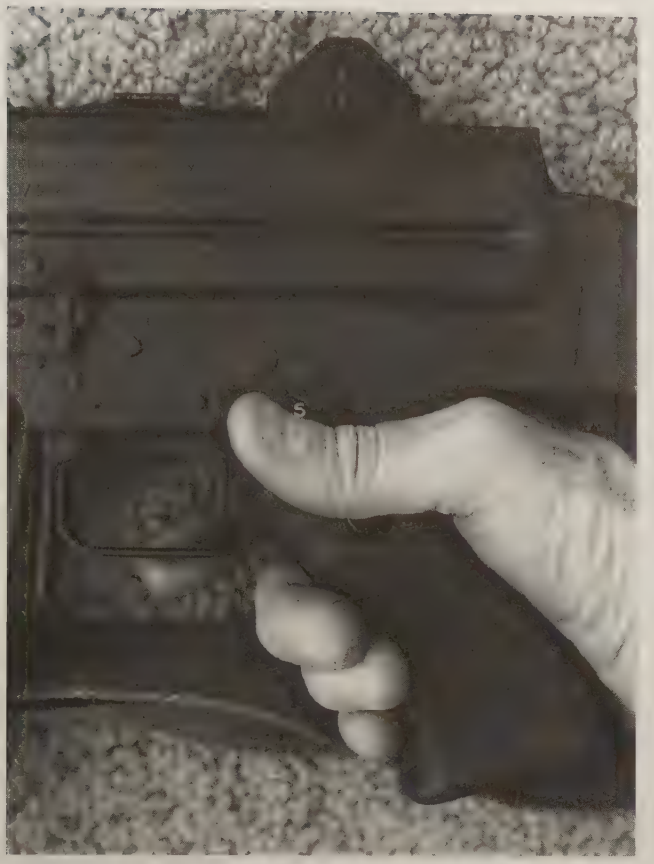
BERETTA AR-70

When it became apparent in the 1970s that the new NATO caliber was going to be the 5.56x45mm, the rush was on to develop a rifle to fire the cartridge. Of course, European arms makers had the advantage of having seen Colt's development but the disadvantage of having to compete with a weapon system that was both familiar to many people and battle tested.

No matter how well a weapon is designed, no matter how well it is tested, only actual use in combat by a wide variety of people will allow a weapon to be fully debugged and developed. Beretta, of course, has had a long history of arms making and developed the AR-70 to meet this demand. These rifles were sold to various small armies and police agencies, and in modified form have now



The Beretta AR-70 was developed because the NATO caliber changed to the 5.56x45mm. It has some nice features but one serious defect that makes it simply unacceptable: its safety system operates backward.



In this left-side view, you can see how the AR-70's safety system works. A shooter should be able to take up the grip naturally and push the safety off. Instead, the safety must be pushed up, thus causing the shooter the break his grip and slow his response time. The photo also illustrates that the handguard is too small for winter use and does not fold down as it does on the M16 or to the side as on the SIG 550 (STG 90).

been adopted as the duty weapon in Italy.

The AR-70 has many very good points but one real drawback that causes me to find it unacceptable. Perhaps taking this last point first is a good idea. The safety works backward. Instead of flipping it down with the thumb to put it off and pressing upward when you are holding it to apply the safety, it works just the opposite. You must flip it up to go off, which is too slow in my judgment for rapid responses. It also only works on one side, which is not very handy for the 11 percent of the world who are left-handed. A flaw that is not as critical but still obvious is the fact that the trigger guard does not fold down or to the side and is small. Although the trigger guard is big enough for gloved fingers, mittens would be difficult—and mittens are, in my experience, much better for cold weather than any gloves.

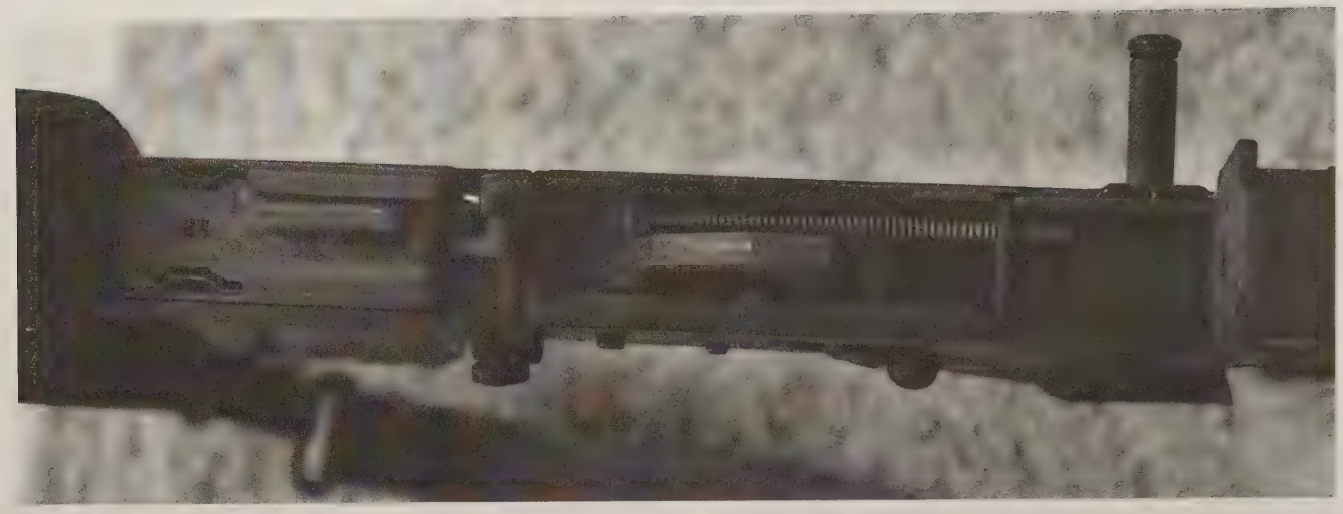
Among the good points on the AR-70 are its centrally mounted magazine release, which reminds me of the AK-47, and the bolt-hold-open feature, always helpful on combat weapons. The trigger is not great but it is adequate for the type of rifle involved. Sights are useful for 300 to 350 meters (although this might be a stretch), but since it was chambered for the 55-grain 1-in-12-inch twist 5.56x45mm ammunition, that is really all you need. The rear sight has a two-position flipper set of 150/300 meters. The markings are painted white, and I actually found it rather distracting because it was so obvious. I would have preferred painting them dark to avoid the white paint dazzling my eye. The front sight is similar to that found on early AR-15s in that it is a cylindrical post. Both the front and rear sights are protected by excellent wings.

The front handguard got quite warm, even with only 100 rounds being fired, and does not have a heat deflector in it, as does the AR-15. The handguard, however, can easily be removed and replaced, unlike those appearing on AR-15/M16 rifles. If you have ever tried to replace the handguards in the field on your AR-15/M16 rifle, you will appreciate this point.

The rifle sports a bolt-release lever like that found on the AR-15. Insert a loaded magazine, hit it with your fist, and your rifle is loaded and ready to go quite fast.

The AR-70 has a gas system that can be regulated, unlike that found in many 5.56x45mm rifles, and if you anticipate varying cartridges or not cleaning your rifle much, this system can be useful. Frankly, I remain unconvinced of its usefulness, but I am open to being persuaded otherwise.

The flash hider is short and open at the bottom, which causes it to kick up dust when the rifle is fired from the prone position. I



The open action on this AR-70 Beretta illustrates the weapon's simple design.

really do not think it is long enough to do much good anyway.

The sling swivels both front and rear are attached to the side of the rifle, which helps the soldier carry the weapon slung over his shoulder in the ready position more easily than if they were located in the conventional under-the-barrel position. There are metal snaps on the swivels, however, and such units always fail the jump test, so for night patrols keep your roll of tape.

The AR-70 has a dust cover like the AR-15 that opens automatically upon firing, which is a nice feature. It can also be closed by finger pressure during any pause in the action. It does not rattle, opens automatically, and will help seal the action from rain as well as dust.

The rifle takes down quickly for cleaning, and all the parts are readily available. The bolt removes quickly without fear of pushing springs, and so parts, and the system used allows a solid bolt, unlike the system on the AR-15/M16, a definite improvement. In fact, the SIG 550 uses a very similar bolt system, which is only to be expected because I believe the designers may be the same in whole or in part. Both the grip and the forearm feel. The stock has enough of a comb to allow you to place your head behind the sights readily. The lack of built-in cleaning equipment reflects lack of experience, I believe. Everyone in Vietnam figured out quickly that you needed cleaning equipment in the butt of the M16A1 rifle if it was to be used successfully in the field.

I rather like the AR-70 Beretta for its many good points, but the backward safety setup prevents me from finding it acceptable. Certainly, it is not in the AR-15 or SIG 550 league but it shows a lot of promise.

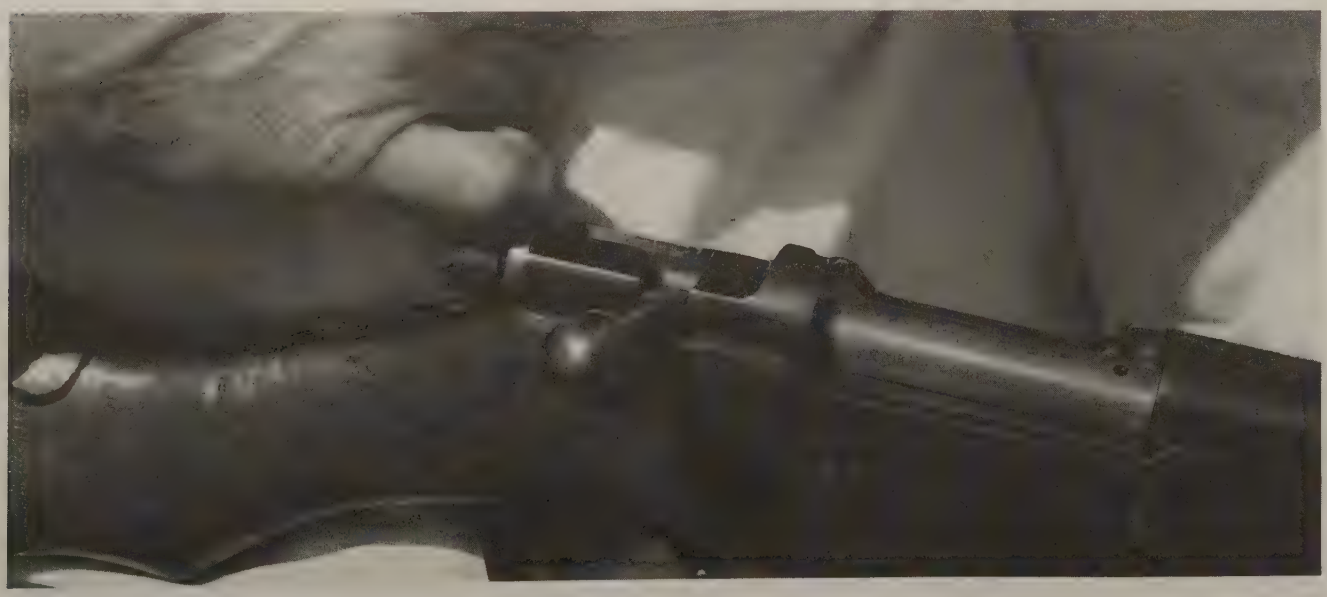
Japan

TYPE 30 JAPANESE—6.5 MM

This rifle, the so-called hook safety model, was the standard infantry rifle during the 1904–1905 Russo-Japanese War. It was also the rifle typically issued to Japanese soldiers stationed in China. As a consequence, it was not something commonly encountered by U.S. GIs, who were more familiar with the later, improved models of 6.5mm and 7.7mm Japanese rifles and carbines.

The rifle has the typical European-style pyramid front sight coupled with a shallow U rear on an open-ramp-style rear. The size of the rear notch is so small that it is difficult to get a proper sight picture even in the bright light of a mid-August day. It must be worse as the light fades. I often wonder how many ex-soldiers are alive due to these poor sights fitted to rifles—lots I would imagine. Using good, fresh Norma ammunition, I shot a 3 7/8-inch group at 100 yards. I attribute the poor performance to the difficulty I had in keeping my elevation straight because of the poor sights, not any lack in the inherent accuracy of the rifle or ammunition. The groups hit 6 inches high at 100 yards, indicating a 400-meter zero.

The trigger pull is good, and both report and recoil are very light, which makes the



The Type 30 has good trigger pull, and both report and recoil are light.

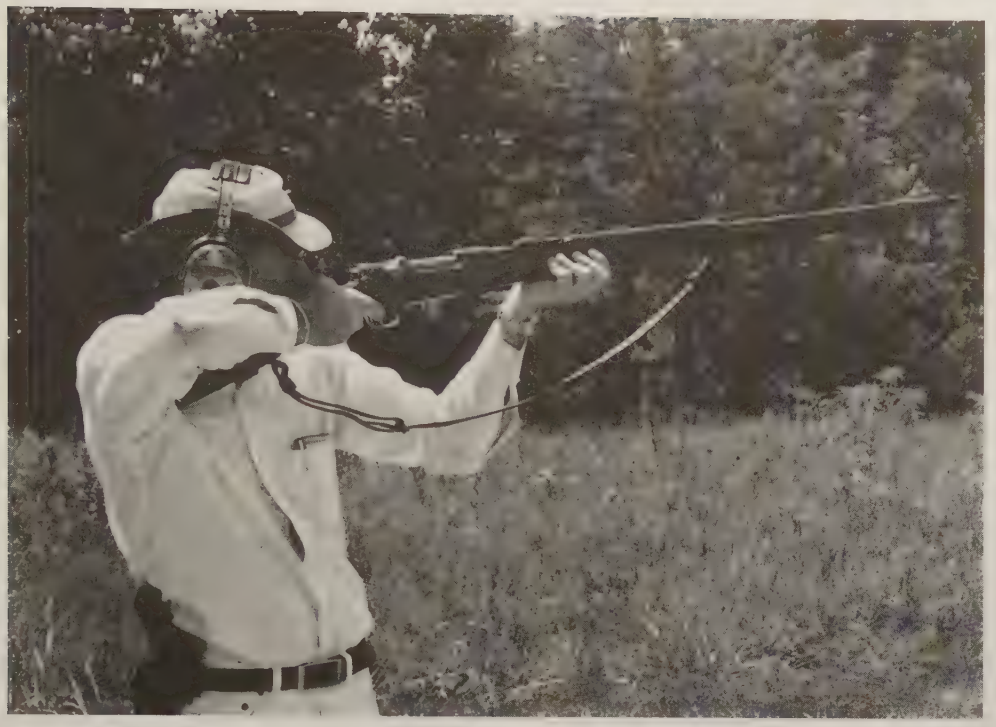
A Japanese soldier of the Russo-Japanese War period armed with a Type 30 rifle.

weapon a pleasure to shoot. On the other hand, the rifle is muzzle heavy, which makes off-hand shooting difficult. The front sight lacks any type of hood or to protect it. Also, the light can hit the sight from either side, which can cause your bullet impact to shift because you will see the sights differently. Shaded by wings or a hood, this problem could be averted. No butt trap is fitted to the stock.

Despite these deficiencies in the sights and the balance of the weapon, I had no difficulty in hitting my 10-inch plates at 200 yards off-hand with the weapon or similar plates at 300 yards from the kneeling position. The action was quite smooth, and I found that I would quickly reload after a shot by rapid bolt work. The smoothness of the buttplate coupled with the ill balance of the weapon caused it to occasionally come off my shoulder as I worked the action rapidly. I suppose with a heavy uniform shirt or the pack straps of my rucksack in place, this problem would be minimized.

Possibly the most interesting thing I learned in working with this rifle is how to operate the hooked safety properly. When you pick up the weapon and start working the safety, you tend to pull it back and press it down with your strongest digit. For me, this is my right-hand trigger finger. When I did that, my hand hit the pistol grip area every time, which made it very slow to remove or reengage the safety. However, with some practice, it dawned on me that this was the wrong approach. Instead, what you want to do is pull the hooked safety with the little finger of your right hand. Doing it that way, you do not hit the stock, and removing it or even applying it was very fast. The safety seems to be shaped perfectly to accept the little finger, and I must conclude that is how it was meant to be operated. I thought my discovery was interesting, having never seen it recorded or reported elsewhere. Although this discovery made the rifle much faster to get into operation on a warm summer day, I wonder how it works with cold-stiffened hands in mittens or gloves. Slow and uncertain would be my guess. I think if I carried this rifle in the field, I would simply leave the bolt slightly out of battery and ignore the safety.

The Japanese soldier in 1904–1905 facing his Russian enemy armed with an M91 Mosin-



The author believes that perhaps the most important thing he learned from shooting the Type 30 was how to properly operate the hooked safety. He learned that you should use your little finger rather than your trigger finger, which speeds up removing or reengaging the safety.

Nagant rifle was not at any real disadvantage. His rifle operated smoothly, loaded quickly from stripper clips, and offered low recoil and report. I think the 6.5mm Japanese cartridge is perfectly adequate as an infantry cartridge, although it may be deficient for long-range machine gun work.

The sights on both rifles were bad: neither was sighted for any practical battlefield distances, and both had safeties that were awkward to operate, especially as the weather worsened. Neither soldier was armed with a weapon that was as good as it could have been, but at least the ammunition for the Japanese rifle was lighter. Between the two, assuming standard ball rounds only, I think the nod would go to the Type 97 rifle.

JAPANESE TYPE 38—6.5 MM

This was the first modern bolt-action rifle adopted by the Japanese in the 20th century. After World War II, when many trophy rifles came in the country, both this model and the later 7.7mm weapon were thought to be weak and inferior to U.S. or European designs. Then H.P. White attempted to blow one up and found instead that it was a very strong action. Still, it had a number of features that made it an excellent military weapon but rendered it more difficult to sporterize, and for that reason many sportsmen tended to shun it. That is unfortunate because the model is

The author tests the Type 97 6.5mm Japanese rifle from the kneeling position at 300 yards.

likely superior in many aspects to the U.S. M1903 Springfield, which came on line in the same period.

The first thing one notes when picking up a standard M38 is how long it is because of its 30 1/3-inch barrel. I am 5 feet 9 inches, and I think it is long and unwieldy. For a shorter Japanese soldier, it must have been worse, especially in the jungle. But the long barrel does burn all of the cartridge powder, reducing the flash to nothing and also lowering the blast effect. As a consequence, spotting the Japanese soldier armed with a Type 38 was more difficult because you had less noise to concentrate on, as well as practically no flash to spot. Actually, it is also rather enjoyable to shoot such long-barrel rifles just to give one's ears a rest.

Additionally, the barrel is chromed. The benefit of this is obvious: little or no maintenance. For jungle fighting in the days of corrosive ammunition, it was even better. The rifle has a top handguard to protect the hand, but it goes only halfway up the barrel, so the shooter must exercise some care when moving ahead after firing several rounds.

The stock carries a cleaning rod slung under the barrel, and a solid buttplate exists. Such buttplates produce more felt recoil, but they are both cheaper to install and longer-lasting than the rubber pads many shooters prefer. The rifle action can be removed from the stock, but that should be done infrequently, if at all, because it changes the POI and necessitates the rifle's rezeroing.

The bolt handle sticks straight out from the action, and some people do not like that, apparently viewing it as inelegant. Still in actual tests, the straight butt handle was faster. The weapon loads with a five-shot stripper clip, like the Mauser M98 from which it evolved. It uses an integral double-column five-shot box magazine. A readily detachable magazine would have been better, but seemingly no one thought about it during World War I except as far as to develop prototypes.

The bolt action has a sheet-metal cover.

Japanese soldiers march in the jungle with the Type 96 6.5mm rifles and Type 96 6.5mm LMG (third soldier from right).

Such covers tend to rattle in the field but they offer good protection, can be removed when going on patrol, and, when fit properly to an original rifle, rattle very little. I imagine that many Japanese soldiers had reason to like it, especially whey were holed up in trenches with the enemy obviously to the front during the rainy season in China. I assume the soldiers took the covers off when in the jungle. Had they been U.S. troops, they would have taped them in place to avoid the rattle yet still get the benefit of the cover. I have never heard of such tape on a Japanese rifle, so I doubt they did it.

Sights on the M30 are difficult to see even though they have a long sight radius. They are the typical European-style pyramid front sight with V-notch rear. I suppose some people can use them effectively, but not me. They are also calibrated to 2,400 meters and start at 400 meters. Given the caliber, this is obviously too optimistic, but when rifles were still used as indirect-fire weapons, I suppose it made sense.

Trigger pull on the Type 38 is generally quite good on all the examples I have seen. It is certainly not up to pre-World War II Model 70 Winchester standards but is infinitely better than that found on the H&K G3.

The buttplate is solid material, but given the low recoil of the rifle, this poses no problem even with shirt-sleeve shooting.

Stocks on the Type 38 are strong, even if the wood is typically not pretty. One feature I especially like is the tang on the rifle action. Two pieces of metal strap project out to the rear of the receiver. They are fitted into the stock in the best tradition of English double rifles and then screwed together. The pistol grip area is always the weak spot on a rifle, but I doubt that anyone ever broke the Type 38 stock, because of the strong metal straps reinforcing that area. Many people who used these rifles in after the war cut off those straps because fitting them to a stock is difficult and time consuming. That is too bad, since these represent a good idea that other countries would have done well to emulate.

The safety on the Japanese rifles, both Type 38 and Type 97, consists of a large knob on the rear of the bolt. Pushing in and twisting to the right locks it; pushing in and twisting to the left unlocks it. To Westerners brought up on Mauser and Enfield rifles, this seems very odd. I got my first Japanese rifle at age 12, and in my early ignorance, I must say I thought it was slow. Then one day, I discovered the trick: it is designed to be used as the safety on a combat rifle, not put on and off in the gun room. To rapidly disengage it, hold the rifle with your left hand on the forearm. Then rapidly grip the pistol grip with your right hand extending your thumb outward as you do. As your fingers touch the stock, your thumb should hit the rear knob. Closing your hand around the stock with your thumb continuing to close around the pistol grip, the checkering on the knob will give you enough purchase to allow the thumb to brush off the safety. As soon as it gets to the off position, the spring inside the bolt will push it back. You then close your hand around the stock and are ready to fire. Once I learned this trick (no doubt taught to Japanese recruits in their first week of rifle training), I discovered that I could remove the safety on a Type 38 or Type 99 faster than I ever could with a Mauser or even Enfield, and, with greater certainty, also felt a little stupid that it took me more than 30 years to figure this out. But I suppose it is better late than never. If you did not know this trick, try it. My standard test for handling qualities is jump-shooting deer in heavy brush. The Japanese rifles pass this test as far as getting the safety off.

The Type 38 rifle is too long for my taste, and the sights are difficult to use, but it is very comfortable to shoot and is certainly equal—if not superior in some respects—to other battle rifles of the same period. The Type 38 carbine with its 18 1/4-inch barrel, although not as pleasant to shoot because of its increased blast, is handier because it is shorter and lighter. I certainly would not feel poorly armed with it, especially if I could install a better set of sights on it.

TYPE 97 6.5MM JAPANESE SNIPER RIFLE

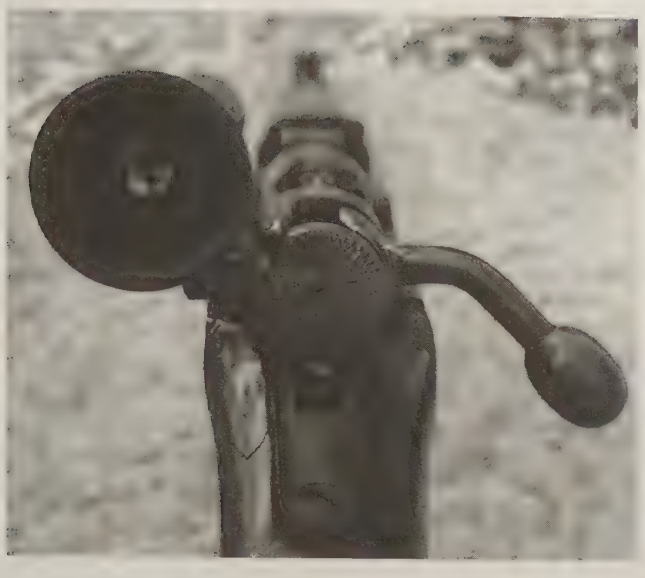
We are all familiar with the many stories of Japanese snipers who inflicted so many casualties on the U.S. forces in the island campaigns. These snipers were widely feared, and, by all accounts, the fear was justified. After testing the snipers' equipment, I must say that it must have been the men rather than the equipment that allowed them to do such work. What they could have done if they had really good equipment is anyone's guess, of course, but I imagine it would have been a lot more dangerous to have been a U.S. infantryman than it already was. No doubt many Americans came home to be fathers and grandfathers than would have if the Japanese had had better equipment.

The Japanese army apparently did not use specialized rifles to its snipers, unlike the U.S. military, which issues match-grade rifles for its snipers. The Type 97 sniper rifle seems to have no better trigger or fitting than any standard Type 97. It, of course, does have a scope and mount added but, otherwise, it seems to be a standard Type 97 (reviewed in the preceding pages). The scope mount is detachable, and apparently the sniper was issued a container to hold the scope when he was not actively shooting. Because no rifle ever seems to shoot to the same POI after the scope is taken off and reattached, I doubt that serious Japanese snipers ever did this, but perhaps they did not shoot them on paper enough to know the difference.

The fixed-power scope is supposed to have a 2 1/2X magnification, but it did not seem to me that it magnified that much. The field of view is only 10 degrees, which makes a narrow cone of viewing. Adjusting the scope is rather difficult, but certainly no one could accidentally move the adjustments once fixed. More important, the scope is not very bright. We are used to the idea that Japanese optics are good and bright, and today most are; but when this scope was made, the Japanese optic industry must have been just starting. The scope's darkness and low magnification severely limit its usefulness.

When I tested the rifle's accuracy, I found that I was able to get three shots into 1 1/2 inches at 100 yards. The results are quite acceptable, but it was very difficult to shoot

The Japanese 6.5mm sniper rifle's short stock, which was designed for considerably smaller Asians, adversely affected the rifle's eye relief. To get a proper sight picture on this rifle, the author had to place his eye on the piece. Upon firing, the recoil drove the rubber cup back on his eye.



The Type 97 6.5mm sniper rifle has its sight mounted to the side of the rifle to permit clip loading. Such an arrangement is unsatisfactory because you cannot get a good sight picture. It is better to mount the scope directly over the bore and load rounds singly.

this group. The stock is short, as might be expected on a rifle designed for small-statured Asians born in the 1920s, but even worse is the way it affects the eye relief on the scope. To get a proper sight picture on this rifle, I had to place my eye on the piece. Upon firing, the recoil drove the rubber cup back on my eye. I found that very unsettling because of an eye injury that occurred when I was in the army, but perhaps I am supersensitive to blows to the eye. I did not like the sensation at all.

The scope is also mounted off center. Although this allows you to use the iron sights, it also means that you are denied a proper stock weld. This will cause you to scatter your shots because your head positioning will be inconsistent. Of course, placing your eye on the scope cup tends to minimize the impact of this problem. The open sights on the Type 97 are calibrated from 400 to 2,400 meters, which means that at typical iron-sight jungle-warfare combat ranges, the weapon shoots too high.

The scope reticle is very odd and not very useful. The Japanese, apparently unfamiliar with the KISS principle, made the reticle very complicated, which made it difficult to use rapidly. Also, it seems to me that the statia would also tend to blur into vegetation, making it even more difficult to use rapidly. For a jungle-warfare sniper rifle, a simple heavy post that could be picked up rapidly in darkened conditions would be better. Perhaps the Japanese thought that they would be using these weapons on the level plains of China, and thus the involved reticle would be effective. I think it would be very difficult to use the reticle at extended ranges on any terrain because it would be easy to cant the rifle and miss the target. It took quite a bit of care to avoid the problem at a mere 300 yards when I tested it. I also doubt how effective this low-power scope would be on targets at 1,400 meters. Maybe it would be fine for big targets, but certainly not men.

The Type 97 iron sights have a good set of wings protecting the front sight, which is a typical pyramid unit. The rear open sight is a V notch, which results in an iron sight pattern that is very hard to see and use.

The Type 97 sniper rifle tested had a good trigger pull, although no better than many standard infantry models I have encountered. The action is quite smooth. The bolt handle on the sniper unit is bent downward. As might be expected, recoil is quite light, and the long barrel results in little muzzle flash and a low report. The Japanese snipers no doubt appreciated these features because they could get closer to their U.S. targets.

The weapon's poor balance makes it muzzle heavy and hard to shoot in either the off-hand or kneeling position. Most snipers likely used these rifles from a rest position, where the long, ill-balanced rifle would place a minimum hardship on the sniper.

The Type 97 has a bolt hold-open that is always a good feature, and although it does not have butt-mounted cleaning equipment, it does have a cleaning rod slung under the barrel, always a good feature too. As with all Type 97 rifles, the safety is quick to release and apply. It also does not require a high-

mounted scope, as is called for on M98 Mauser actions.

The Type 97 Sniper rifle certainly has a lot of problems associated with it, which no doubt severely limited the soldiers assigned as snipers who had to use it. It reflects great credit upon the men that they were able to accomplish as much as they did with such equipment. It also proves what I always maintain: good men are more important than good equipment, although good men and good equipment led by good officers and NCOs are by far the best combo.

TYPE 44 6.5MM JAPANESE CARBINE

The Type 44 6.5mm Japanese carbine was introduced in 1911 and was issued mainly to cavalry units. Most of us do not realize that such units were widely used by the Japanese prior to 1945, because we tend to think of the Japanese forces fighting in island jungles. In, fact the Japanese deployed many troops in China in the pre-1945 era and fought a war of variable severity with China, starting in 1931.

All Japanese rifles of this pattern have a very fast safety. It is convenient, free from projections, sturdy, and, most important, it can be disengaged rapidly. Until you learn how to operate it properly, it may seem awkward, but once you realize you are to push in with your thumb only and twist your hand to get it off, you will realize how quickly it operates.

The rifle has a pyramid front sight, but one that is well protected. The rear sight is a shallow V notch and is calibrated from 400 to 2,000 meters. Again, this means aiming at the knees at realistic combat ranges, which is troubling. The sights are hard to see, slow to use, and almost worthless in dark conditions. The action did offer a bolt-hold-open device, a good feature that we must remember was missing from the German M98 being produced at the same time. The action was very smooth, which allowed the weapon to be fired quickly. The bolt handle is well positioned and can be operated properly with the handle in the palm of the hand rather than the slower method of pulling on the handle with your fingers. The trigger pull is heavy, which tends to limit the shooter's ability to hit targets. This is especially evident in the off-hand mode, where trigger control is especially critical. The weapon is light, short, and well balanced, however, and it can be shot from both off-hand and kneeling positions.

The rifle does not have a cleaning rod slung under the barrel, but it does have a very interesting butt trap that holds the cleaning rod in a rattle-free position—an excellent feature. The rifle has a sling mounted on the side to allow the cavalryman to carry the weapon slung diagonally across his back. It also is equipped with a dust cover to protect the bolt—this feature was undoubtedly added because of the dust any cavalryman is likely to encounter in the field. Many people argue that such covers rattle and give away the soldier's position and thus should be removed. This may be so in a jungle environment or when the dust cover is not the original one designed for that rifle, but at least on the Type 44 carbine I tested, it did not rattle very much. Certainly, it did not make nearly as much noise as the metal sling swivels did when contacting the metal sling mounting points. For a cavalry carbine, this dust cover was a good idea and, of course, it could always be removed if absolute silence was called for on a night operation.

Recoil is light, and accuracy is more than enough for the mission the carbine was called upon to perform. The ballistics of the cartridge ensure a low blast, even with the shorter barrel. The integral bayonet makes the weapon slightly too muzzle heavy for my tastes; I would remove it if I were carrying the weapon in combat.

Sometimes we tend to view these Japanese weapons as crude and old-fashioned, but actually they are light, handy, well made, and they use a very effective cartridge when compared with what was being made in Europe and the United States at the time.

Full recoil on the Type 44 6.5mm has light recoil and low muzzle blast.

The cleaning rod on the Type 44 is contained in the butt and accessible by depressing the lever on the right of the butt. This is an excellent feature and certainly a useful touch for a carbine used on the dusty plains of China by cavalry troops.

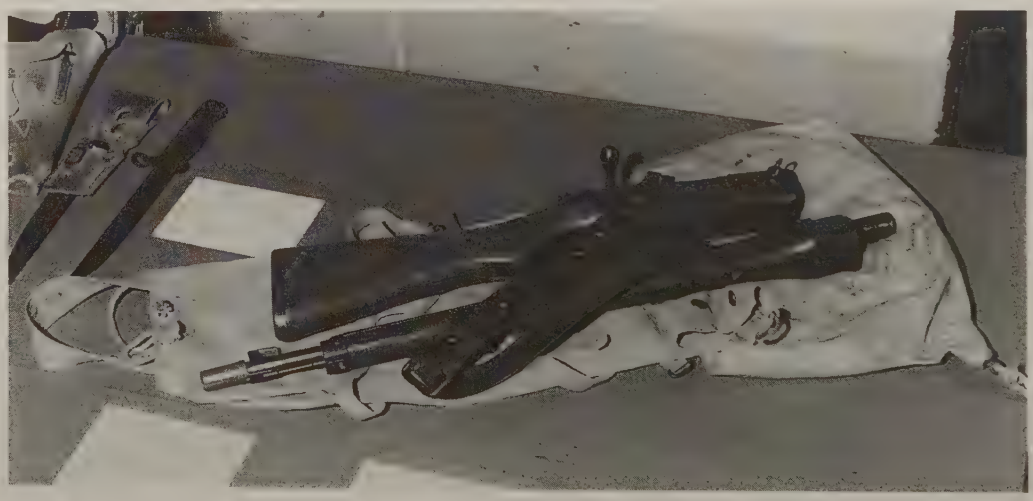
TYPE 97—7.7 MM

Apparently, the Japanese forces in China encountered ranging problems with their 6.5mm machine guns and rifles. In response to that, they introduced the Model 99 in 7.7mm. Basically, this can be viewed as the ballistic equivalent of the .30-06 cartridge, although they are not interchangeable. Whether or not this caliber change was truly successful I do not know. Given the island campaigns fought, I would suppose that the problem of resupply would be less than for European armies. The Japanese could issue one-caliber weapons to all the troops on an island. Resupply of weapons or ammunition proved to be almost impossible anyway, given the U.S. control of both the air and sea after the Battle of Midway. Still, two different calibers that really did the same thing seems a rather odd and dangerous thing to do in the middle of a war.

The Model 99 shares many design features with the

Model 38. The front sight is a blade shape rather than pyramid, and the rear includes a peep sight. Unlike the Model 38, the Model 99 has sights calibrated from 300 to 1,500 meters. That is still too long from a practical standpoint, but slightly more realistic. Special winged sights to allow the soldier to lead airplanes were installed also, but those are, naturally, totally silly because bolt-action rifles are not (nor were they in 1939) proper air defense.

The author testing the Japanese Type 99 7.7mm rifle off its monopod and with its rear sight up. Note the distance between the peep sight (located over the chamber) and the eye—much too far for best results.



The 7.7mm Japanese paratroop rifle disassembles into a barrel and receiver unit.

The buttplate is solid metal, and, as with the Model 38, a metal strap through the grip assures the soldier that the stock will not break at the wrist—a very good point in my judgment. As with the Model 38, a bolt cover exists, and my comments in that section regarding bolt covers apply equally here. Trigger pull is quite good for a military rifle. The rifle has a flush magazine, but you can easily unload the weapon without running the rounds through the weapon, unlike on a Mauser, by pushing this latch in front of the trigger guard. It is rather like a good-quality sporter, in fact. A cleaning rod is slung under the barrel. The bore is chrome-lined, making maintenance much easier with corrosive primers and in humid jungle conditions.

An interesting feature on the Type 97 is the presence of a monopod on the rifle. Although the arms or legs are somewhat thin,

they are sufficient to permit the shooter to rest his rifle on it for a steadier shot. They should not be viewed as a bipod, however, because too much pressure will bend or warp them. The bolt handle sticks straight out, which is faster to operate than curved handles, and that, coupled with the five-shot stripper clip loading mechanism, yields a fairly continuous stream of fire. The bolt handle is smooth—as it is on the Type 38 and as it should be for a proper bolt action, where you wish the handle to be able to turn smoothly in the palm of your hand.

The safety system is the same as that found on the Model 38. As discussed with the Model 38, this is a very practical and fast safety if the shooter practices enough with it to discover its secrets. Until you do, it appears to be awkward. Once the secret is disclosed, the Mauser safeties all seem slow and awkward.

With its shorter barrel at 25 3/4 inches and 7 3/4 pounds, the Model 99 is very convenient to handle, and it balances well. The recoil is greater because of the more powerful cartridge, and the noise level is higher because of the shorter barrel. Of the three Japanese rifles tested, I prefer the Model 38 carbine because it is light, short, and handy, and uses a cartridge with greater power than the 5.56x45mm guns of today offer.

TYPE 11 LIGHT MACHINE GUN—6.5 MM

The Type 11 LMG was known to U.S. veterans of the island campaigns by the term *woodpecker,* at least in my part of the country, because of the distinctive sound made when firing. Many of us raised on *Small Arms of the World* had long ago concluded that the Type 11 was a poor, obsolete design. A recent test of the weapon found this to be inaccurate.

To a man, all the people present at the test thought the Type 11 was a wonderful, controllable LMG. It is easy to see why people think it sounds like a woodpecker: the light report and tendency to fire five-shot bursts do bring that bird to mind, even when fired more than a half century and half a world away from jungles of the South Pacific.

One of the most interesting features on the Type 11 is its cartridge hopper system. This hopper system does away with magazines and lowers the profile of the weapon, but it does expose the ammunition to the elements.

The weapon is rather short and hence handier than many similar weapons, but it is not particularly easy to handle. There is no forehand to hold on to when firing off-hand or from the hip, and the bipod legs are not that easy to use as a substitute. It is quite easy to have your hand slip and hit the hot barrel

The heaviness of the Type 11 light machine gun and the lightness of the cartridge it fires produce light recoil, which is evident in this photo. Note the cases in the air.

shroud. Therefore, it is really suitable only for prone-position shooting.

The cartridge hopper system is interesting because it avoids the problem of magazines and permits a low profile for the weapon. It is convenient to operate and allows the shooter to use the rifleman's stripper clips without any delay. On the negative side, however, the ammunition is exposed to rain and other contaminants, which would make their way into the gun and ultimately affect reliability.

Because the weapon is somewhat heavy and the cartridge somewhat light, recoil is quite low, and the weapon fires accurate bursts. It feels much like a .22 rimfire in a light rifle. Even long bursts seem to simply hang in the target area. Of course, 23-pound machine guns, even somewhat short ones like the Type 11, must have been a handful for small-statured Japanese soldiers in the Burmese jungle.

The front sight is a pyramid type but is well protected by wings. The wings had holes in the side of them to allow light to fall on the front sight. Still, I would paint them white to give better contrast and more rapid pickup. The rear sight is V-shaped and difficult to use.

The safety is difficult to apply in either the on or off position, but I would not use it on an open bolt weapon, except for static ambush situations. The bolt-retrieving lever has to be pulled all the way to the rear, or the bolt will not catch sufficiently to pick up a cartridge.

Although not obvious in the photos one

This rear view of the Type 11 LMG shows clearly the crooked stock, which is offset to the right. The stock is angled in this way for eye alignment.

typically sees of the Type 11, the stock is not only an odd shape, it is also offset to the right. The grip is wrapped in metal, as is the front part of the stock. If you're not careful, you'll place your cheek on the metal, burning it in the summer and freezing it in the winter. If placed properly, however, your cheek will be on the wood. The grip is rather cramped, and the shooter must hold his hand at a rather odd angle to fire it.

Although it might appear from my comments that the Type 11 is not a very good LMG, for some reason I like it, as did everyone who shot it during my test. Perhaps we expected so little that we were impressed with only a few good features. What I think it is, however, is the long, accurate burst the weapon fires. If a shooter is in position, has lots of loaded stripper clips and a well-trained assistant, I have no doubt that he could keep firing it as long as he could flip open the hopper handle, throw in some stripper clips, and keep the pressure on the ammunition so that it fed through the system. Not only would he be able to keep up a high continuity of the fire, he could also deliver very accurate fire. Long, accurate bursts are always a good feature; most of the weapons tested jumped around so much that bursts were generally a waste of resources.

TYPE 99 LIGHT MACHINE GUN

Older readers will be familiar with this weapon from Pacific campaigns, whereas middle-aged readers will remember it as a cheap LMG that could be converted to shoot .30-06 when used with a BAR magazine. Many were so converted because of the lack of 7.7mm Japanese ammunition and used in the Cuban wars of the early 1960s. Since that time, however, most people have not really encountered this LMG very much, and I fear that many people might not think much of it. They are wrong!

The Type 99 is an excellent LMG—every bit as good as the Bren gun in my opinion. The rate of fire is higher than that of the Bren, but I was unable to fire single shots with it. However, I could easily fire two-shot bursts, and those were generally right on the intended target.

The front sight is well protected by sturdy wings but, unfortunately, is pyramid-shaped. It is also dark and needs to be painted white to allow more rapid pickup. The rear sight is a good peep unit.

The buttplate is quite curved, and the shooter must put his shoulder down and then up to hit the curve of the buttplate. When this is done, however, it is quite comfortable. It is simply a different procedure from that used for firing U.S. or other LMGs.

The Type 99 is equipped with a bipod at the front and a monopod at the back. Frankly,

The Japanese Type 99 LMG is every bit as good as the Bren, in the author's opinion.

The Type 99 is an excellent weapon for jungle warfare.

I think monopods are silly and imagine that most are rapidly thrown away; however, when I lay on the ground with the Type 99 in front of me, peering downrange for my target, I used the monopod to get it up to the correct level and to keep it there. Placing my hand and face on the same spot that 50 years ago a Japanese soldier had placed his and looking down range over my sights, I could pick up the vibrations of what he must have felt as he strained his eyes and waited to fire. In that situation, the monopod was useful. Otherwise, I would throw it away.

The magazine is top mounted, which enhances reliability. A large hole in the magazine-release flipper allows the shooter to look up to see how much there is in the magazine (this feature should have been added to the Bren). Magazine changes are quick and easy.

The weapon has a dust cover to protect the magazine part if a magazine is not being carried. Upon firing, the cover pops open like the cover on an M16 rifle—an excellent feature.

The Type 99 can be fitted with a bayonet, but I doubt that anyone used a bayonet much with the Type 99—although I suppose it would have been useful for jabbing prisoners on death marches, work details, and such, something the Japanese were well known for.

The safety is not impossibly slow to operate, but as with any open-bolt gun, I would not trust it on patrol. However, in a fixed-ambush position where I would want to cock the weapon yet avoid inadvertent firing, I might well use it.

The Type 99 is chambered for a much more powerful cartridge than the 6.5mm ammunition used in the Type 96 LMG, which looks very much like it. Unfortunately, it also weighs 4 pounds more and is rather long and heavy for either off-hand or kneeling firing. Additionally, it lacks any real forearm to use in holding the weapon if it must be fired in either position for long periods. Accordingly, the weapon will be typically used in the prone position.

The Japanese Type 99 is quite a good weapon for jungle warfare. Frankly, I would have preferred it to a belt-fed M60 for jungle patrolling. The Japanese soldier who used the test example had a tough weapon that for its purposes was critically superior to the BAR or Browning M1919 used against him.

Korea

DAEWOO 5.56X45MM

When developing the Daewoo rifle, the Koreans had the advantage of being able to look at a wide variety of 5.56mm rifles and then incorporate the best features of all of them in their rifle, which now of course is the standard service rifle in the South Korean army.

Although it looks a lot like the M16 because of the color of the stock (black) and metal (gray parkerizing), it is not a copy of the M16. It uses a different gas system, although it operates much like the AR-15 rifle. Conveniently, it does use the M16 magazine, which has basically become the world standard in magazines for Western 5.56x45mm rifles. (This is a little curious because the M16 magazine is not totally free of design flaws.)

The Daewoo's rear and front sights are well protected against blows and are adjustable. The front is a nice blade shape but needs to be painted white to allow rapid pickup in dim light.

The grip and magazine area layout is very similar to that found on the M16. The rifle is difficult to use by left-handed people, and flipping the safety either off or on without breaking your firing grip is hard. Even with my size-9 hands, I could not flip the safety from the on position to the off, semiauto fire position without breaking my firing grip.

The trigger on the example tested was very good, free from excessive take-up or overtravel. It was as good as those found in some AR-15 match rifles I have encountered. It may even be "too good" for the rough and tumble stuff, although I had no problems with it.

The stock is a full-size plastic stock, unlike the sliding-rod stock found on the carbine or SMG model and was very comfortable to use. It also folded to the side so that you could collapse the overall length of the weapon. By virtue of the very solid lockup on the folder, plus the design of the stock, you are left with a very nice unit. Most folding stocks are either flimsy and move about (making fine shooting difficult) or are made of tubes or rods that hit your cheek each time you fire a round (decreasing accuracy).

The forearm is of a nice size, contains a heat deflector, and is comfortable to use. I much prefer it to the earlier triangular AR-15 handguards. The rear sling swivel is poorly placed; it interferes with the safety operation when the sling is used. Moving it back and up a bit would solve the problem, and it is surprising that the Koreans have not moved it back already. The front swivel is placed in an acceptable fashion.

The Daewoo is a fairly inexpensive rifle and offers many of the best points of a number of modern designs. Although not as good as the SIG-550 (STG 90), it is more widely available, uses a magazine that is commonly available, and is generally cheaper than many of its competitors. If the M16 was not being given away by the U.S. government, I imagine the Daewoo would be a much stronger contender in the world marketplace because of its qualities and cost.

Daewoo 5.56 SMG version of K1 stock is similar to the M3 SMG. The very stable bolt handle is handy for kicking open and pulling to the rear with the left hand, unlike on the M16 rifle.

The folding stock on the Daewoo allows compactness yet provides a much better shooting platform than do most folders that have tubes or struts.

Latin America

REMINGTON ROLLING BLOCK CARBINE

Whenever I handle a Remington Rolling Block rifle, I cannot help thinking of that great tale told of Nelson Story, who settled the Montana cattle country in the late 1860s. Although he was ordered not to proceed by the U.S. Army, Story took his herd of Texas beef and went completely through the middle of the Sioux Nation with 50 Texas cowboys each armed with a Rolling Block and a wagonful of .50-caliber rimfire ammunition. They fought Indians every day on the way and won. He thus founded the cattle industry in Montana. Any rifle capable of such a feat must have some good points to it.

The Rolling Block was also very popular in Latin America, as well as Egypt and Turkey, in the period after the U.S. Civil War and before Mauser started developing its repeating rifle. I have always wondered why the rifle was not adopted by the U.S. Army, but perhaps the large quantities of Civil War muskets that could be converted to the trapdoor configuration, plus the not-invented-here-syndrome, caused it to be rejected by the U.S. forces. Certainly the Rolling Block seems to be as good a rifle as the Springfield M1873.

The Rolling Block comes in a wide variety of calibers and lengths. Large black-powder cartridges are common, such as the .43 Egyptian and .43 Spanish, but I tested an example in 7x57mm, which was a very popular caliber in the late 1800s and early 20th century.

Most Rolling Blocks one sees are rifles, but the test example was a very cute ex-Uruguayan military saddle carbine. I have a soft spot in my heart for these little short rifles.

The carbine version of this rifle is fun to carry because it is lightweight and yet shoots a fairly effective round. Merely loading one of the carbines up and taking a walk makes me imagine myself off on an exploring trip, in search of wild game. And it also brings to mind what the old Indian said about shots: "One shot—killum deer. Two shots—maybe killum deer. Three shots—miss deer." Unlike similar weight Winchester carbines, the Remington Rolling Block shoots a real rifle cartridge, not a pistol cartridge.

Perhaps evaluating this carbine against the Spanish M93 carbine, the M96 Boer War 7x57mm carbine, or the M94 Swedish 6.5x55mm carbine is the fairest test. Because the Rolling Block has a shorter receiver (due to the fact that it lacks a bolt), obviously it will be shorter overall than another rifle of the same barrel length. Because the end of the barrel is closer to your face on the Rolling Block, blast can be a problem, but because the cartridges involved are not very intense, this is not a real problem. The Rolling Block thus becomes a very handy little piece of equipment.

Sights on the Rolling Block are typical of the period. The front sight features a pyramid

Mexican troops in the pre-1914 era using the Remington Rolling Block 7x57mm carbine.

The left side of the Remington Rolling Block carbine, a weapon the author found to be handy to carry in the field and well balanced for off-hand, sitting, or kneeling use.

front that is difficult to pick up, and the rear sight has a very small shallow notch that makes holding consistently quite a challenge. The rear sight offers elevation to long distances that are unlikely to ever be used today, but in the days before indirect-fire and area weapons, they were used with success. The Turks used their Remington Rolling Blocks once to rain bullets over the walls of a fort at 2,000 meters and into the troops manning it, as well as the *New York Times* reporter, who was present in the fort and who died from a bullet in the head. Even though it is not used today, indirect fire with a rifle can be effective, so it may have been worthwhile to include such sights on rifles of the period.

Of course, the Rolling Block only offers a half-cock notch as a safety, there being no other manual safety. I do not know whether the notch would break if the rifle fell on the hammer, but it is possible. The message is clear: do not drop the rifle!

The rifle tested had a fairly heavy trigger pull, but it was crisp. The hammer must be pulled manually to the rear, and it had a strong spring fit, so it takes quite a lot of muscle to pull it. When the trigger is pulled, the hammer falls forward, hitting the block. This is somewhat jarring and impedes accuracy—though not as much as an open-bolt LMG, but more like a Colt Single-Action Army revolver with its long, heavy hammer drop. On the plus side, however, there is enough force unleashed by this heavy hammer-and-spring combination that marginal ammunition will still fire. This was even more important in early years, when self-contained cartridge technology was low and storage conditions in less developed armies were crude.

To load the Rolling Block, you must cock the weapon, pull down on the back of the block, and then insert the cartridge, close the block and, assuming you wish to fire at once, pull the trigger. If you do not want to fire immediately, you pull the trigger and lower the hammer to the safety notch. With cold-stiffened and slick hands, the hammer probably "got away" many times, and I am certain accidental firings were common.

The empty cartridge is extracted by cocking the hammer and then pulling back on the block. This will pull the case clear of the chamber. You can then reach up and pull out the empty case and prepare to load a fresh round, starting the cycle over again. Since the weapon does not use stripper clips to feed ammo and offers only one shot at a time, speed of fire must be lower than it is with a stripper clip-magazine Mauser rifle. Basically to get any speed, you should withdraw a loaded cartridge from your belt and hold it between your fingers while you pull out the empty. Shove it in the chamber, flip the block upward, and you are ready to fire again. With a little training, 10 rounds a minute can be fired accurately. With a Mauser, you can do the same in 20 seconds.

The trigger guard is small, which may make winter operations difficult, but the rifle can be used by either left-handed or right-handed shooters—always an advantage in a combat rifle. Additionally, the rifle has very little to go wrong with it. Although perhaps not quite as simple a weapon as a rock, it is a very simple weapon with big parts. Even native soldiers with little training in machinery should have been able to operate it without difficulty, and even with little or no maintenance. Compare this with maintenance on an M16A2 rifle and you will see what I mean.

In testing, I found that this rifle was very handy to carry in the field and that it balanced well for off-hand, sitting, or kneeling use. The short barrel and short sight radius coupled with the poor sights, made long-range work more difficult than it would have been with a longer weapon, but in my hands the carbine was capable of hitting 10-inch metal plates at 300 yards, even though accuracy quickly fell off beyond 560 yards.

By the time the test weapon was made, the Rolling Block action was obsolete and certainly cannot compare to the Mauser bolt action, which was then available as a battle rifle. However, in its prime (1867–1888), it was one of the best rifles in the world. For an

army with untrained soldiers or those it could not trust to be loyal, these single shots still made good sense to buy and issue when the enemy was even more poorly armed—as was the case in much of Latin America or colonial Africa. It is for those purposes that these rifles were made late in the 19th or early in the 20th century and in calibers that were available in much more effective weapons.

For us today, they serve as reminders of the days of Nelson Story and Latin American bandits, and are fun to tote along when loafing in the woods.

REMINGTON ROLLING BLOCK M1902 RIFLE—7X57MM

The rifle version of the Remington Rolling Block is a different proposition. No longer is it merely a very cute rifle to carry on jaunts in the woods. Instead the rifle cries out to be evaluated as a combat rifle. Who among us can hold one in his hands and not think of a soiled, white-shirted peasant fomenting a revolution in Latin America or of a battle in the Sudan of pre-1914? Who among us cannot picture himself as a soldier of fortune fighting to topple the despotic ruler of a far-off country?

When I shot this rifle from a rest, I got a 3 1/2-inch group at 100 yards, but it was 10 inches high, betraying its 400-yard zero. The sights were very hard to see, and the large wings that served as elevation steps on the rear sight made them even more difficult to see because of the disruption that the wings caused. Sight clutter, I suppose it should be called.

The report of the 7x57mm rifle is quite light, as is the recoil. This is in rather sharp contrast to what I encountered when testing the carbine version of this weapon.

The trigger pull on the example was very heavy, and the hammer fall quite heavy too. I cannot imagine any primer failing to ignite if it had any capability of firing when struck by such a blow. I suppose it was this blow that gave these rifles such a high reputation for reliability, especially considering the areas of

The author illustrates the proper technique for firing the Remington Rolling Block rifle. With the small finger of the shooting hand, he pulls the block to the rear, using a hook-like technique for speed of fire. Note that the rifle remains at the shoulder.

the world where they were used and the likelihood that ammunition was stored under such unsuitable conditions that the primers were compromised to one degree or another.

Naturally, the rifle version had no safety other than a half-cock notch in the trigger (just like the carbine). I would imagine that dropping the rifle on the ground might very well discharge it as a result of a sheared sear, but the parts are big and sturdy looking, so perhaps my concerns are ill founded. I am not certain I would trust it except under circumstances in which it would be critical to have the weapon instantly available.

But what was most interesting about firing this rifle is learning how the Rolling Block should be handled if you use it as a military rifle rather than as a sporter. In looking at it and considering its age, the thought occurred to me that there must be some way to shoot the weapon accurately and fast—otherwise, no military would have considered the weapon once repeaters came along. Being reliable, hard hitting, and inexpensive is simply not enough. After some experimentation, I rediscovered what I believe to be the secret of fast shooting with the Rolling Block. I realize that soldiers now long dead knew this, but, unfortunately, I have never read anything written by such men about this method. Perhaps they thought it was obvious. It was not to me.

When you use the weapon as a sporter, you cock the hammer with your thumb. This stretches your hand out, weakening it; because of the heavy spring, this is a difficult task to perform rapidly. Next you take your index finger and pull back on the action block by the metal projection on the side. At that point, you insert a round, and then, holding the metal projection between the thumb and index finger, you close the action block and you are ready to fire. This is very slow.

The way to operate the action when used as a military rifle is to hook the little finger of your hand that is cupped on the hammer spur, pulling rapidly to the rear. As it reaches the sear notch, it will be cocked, and your hand will slip off. Reach forward again and hook the metal projection on the block with the little finger on your cupped hand and pull it to the rear. As it goes into position, your hand will slip off again. Any empty will be ejected fully and firmly to the rear. Reach down and withdraw a round from your belt, push it into the chamber, and then, using the heel of the hand, hit the metal projection on the block, which will firmly chamber a round and close the action. Grab your grip and fire a round.

In actual tests, I found that from the kneeling position I could fire five shots and keep them all on the metal 10-inch target at 100 yards in 16 seconds. I believe I could trim a few seconds off with practice. It must be remembered that the pre-war British army had a standard of 15 shots in one minute with bolt-action Lee Enfields; thus five shots in 16 seconds is close to 20—or above the British standard with a bolt action. Naturally, to do this you need a proper cartridge belt or to position rounds on a trench shelf before you, but it does show what can be done with practice. The Rolling Block action is not by any means a slow, single-shot rifle action. The barrel and forearm did get quite hot during this experimenting.

Although the sights could be a lot better, the Rolling Block has proven itself over many years to be a very rugged action. It consists of very few parts, and those that do exist are big and strong. It is a rifle to be taken to faraway places where maintenance is limited and used by people who have little understanding of machinery. It will never be as fast as a semiautomatic, but it is really not that far off when compared with a bolt-action gun in the hands of someone who has worked with it long enough to learn its secrets.

The Netherlands

DUTCH 6.5 RIFLE (HOLLANDISCHES INFANTERIE-REPETIER-GEWEHR M95)

This is basically the standard Mannlicher-style of bolt action. Unlike on the carbine version, this rifle has no extra wood covering the magazine housing because its designers did not anticipate that the rifle would be slung across the back of the soldier on a horse or bicycle.

The rifle is equipped with a typical pyramid front sight that is unprotected by any wings or hood. Despite the fact that the sight is firmly staked in, being left unprotected is an undesirable feature. Additionally, the sun will reflect off the front sight in a different fashion, depending upon the time of day, which may cause the shooter to hit different POIs. The rear sight is V-shaped and calibrated from 400 to 2,000 meters. This naturally causes the shooter to hit very high at 100 yards, as with many pre-World War I rifles, because the lowest sight setting is 400

Dutch colonial troops in this pre-1939 photo wade a stream holding their M95 rifles out of the water.

The Dutch M95 rifle uses a Mannlicher-style action.

meters. The rear sights are very hard to see, being small and dark and having a very shallow notch.

The Mannlicher bolt action is always slower than a typical Mauser action because the bolt handle is farther away from the shooter, who must reach a greater distance. The Dutch rifle has a good-size bolt knob, however, which makes operating the action faster than on many other Mannlicher designs. The rifle has the standard Mannlicher safety, which is slow to both release and apply.

The test example was nearly new but had a very hard trigger pull and a very stiff action. To operate the action, I had to turn the rifle about 20 degrees to the left to get enough angle on it to turn the bolt with the rifle at the shoulder which, of course, is the way you should operate a bolt-action rifle to get the maximum speed from a bolt-action combat rifle.

The rifle is long and, although not too heavy, it is ill balanced. Consequently, in both off-hand and kneeling positions it is difficult to hold the rifle steady because it feels very muzzle heavy. Unlike the carbine model, which is very handy, the rifle is awkward to handle. However, on the plus side, the recoil is quite light, and the report is very mild, making the weapon pleasant to shoot. It does not recoil as much as an M16 rifle, yet the 6.5mm Dutch round would, I believe, possess a greater power and ranging ability.

Long Mannlicher-style rifles with poor triggers and sights do not make great combat rifles. Of course, the Dutch managed to stay neutral in World War I, and the Dutch army saw only limited fighting in World War II.

When the Japanese invaded in 1941, the Dutch military may have had an opportunity to use these rifles, and I am certain that they were soon found wanting. The vast majority of battle experience the Dutch troops got was in their former East Indies possessions after World War II. However, the activity there was mainly what came to be called counter-insurgency, so I am certain the handier carbines got much more use than this rifle.

MODEL 95 NO. 4 N.M. 6.5 DUTCH CARBINE

Most of these rifles seen appear to be heavily used and abused from having served in the Netherlands East Indies for many years, but the rifle tested had apparently been spared this fate and was in good condition. One feature I especially like about this rifle is the wood fitted to the left side of the magazine.

Dutch East Indies colonial troops armed with M95 carbines in this pre-1945 photo.

It took some care and attention to do that, and I am certain it was done to avoid the metal's hitting the soldier's back when he carried this weapon slung across his back. I know of no other rifle where such care was taken.

The Model 95 uses the standard Mannlicher-style action, which is somewhat slow in comparison with a Mauser action because the bolt handle is located farther from the hand. The safety is also slow to engage or disengage. The Dutch carbine, however, has a good-sized ball on the bolt handle, which allows the shooter to get a solid grip on the bolt and thereby improve the speed at which the bolt is operated. Still, it was slower than a Mauser bolt system and much slower than a straight-pull rifle.

The rifle has no butt trap, but it does at least have a cleaning rod, which I value on any combat rifle. The sling swivels are mounted on the side of the stock, no doubt for the soldier to sling the rifle flat on his back while riding a horse or, more likely, a bicycle. Unfortunately, the leather of the sling hits the shooter's face when he takes a proper shooting position. This impedes aiming somewhat and is especially uncomfortable when snap shooting is used on close-range targets.

The sights are the typical European pyramid front sight with no protective wings and a V-notch open rear sight. The lowest setting is 400 meters and is calibrated to 2,000 meters. Once again, not having it sighted from 100 to 800 meters is a mystery; certainly that would have been much more practical, especially for a carbine. The shallow V notch and pyramid front sight combination is very hard to use effectively and slow to acquire. In poor light, it would be worse to use this than it was in the daytime when I tested the weapon.

The Model 95 No. 4 N.M. carbine is a nice rifle to use from the standpoint of balance and feel. Recoil is light, yet due to the construction of the bullets and the coefficient of the loads, it has adequate penetration and power for military purposes. The action is not particularly quick to use, and the safety is awkward and slow, but it does feel "alive" in your hands. It has a good balance for both off-hand and kneeling shooting. Unfortunately, the sights fitted are so hard to use that a shooter must fight to get any kind of results and must remember to aim lower at any of the typical ranges at which the weapon is to be used. This is hardly a satisfactory arrangement.

Norway

M1894 NORWEGIAN KRAG 6.5

I like Krags—all Krags, no matter what their caliber or nationality—and this one is no different. It is very slick in its action. I found that I could eject and chamber a new cartridge before the one extracted hit the ground. A rifle that you have shot a lot and used for many years will frequently be almost as good as a Krag, but nothing is ever quite as good.

Having said that I really like Krags, I must admit that they lack certain things as rifles, and especially as battle rifles. The trigger on the M1894 is the typical two-stage military unit with a lot of slack and a heavy pull—not something that facilitates good shooting. The sights are adjustable to hit on target from 100 meters on out to the long ranges typical of the day before machine guns and mortars. At least, you do not have to aim at your assailants' knees. Unfortunately, it has a very small, narrow V-shaped notch that tends to blend in with the wood on the forearm, making it very difficult to see the front sight properly. This caused me to have excessive stringing because I got a different view of the front sight. Elevating the rear sight to 300

The magazine can be opened to permit reloading. This type of reloading action is not a liability on a hunting rifle, but it is on a combat rifle.

A South African Boer commando armed, interestingly, with an M94 6.5mm Krag rifle.

meters or more eliminates the problem, but close-range shots are frequently more important than long-range ones, in my judgment. A little work with a wood rasp would also solve the problem, but it really should not exist.

Interestingly enough, the barrel and forearm get very hot when firing a very few shots. I suppose this is because the barrel is quite thin. That thinness, of course, allows the rifle to balance well even with a long barrel.

The rifle has a butt trap to contain cleaning equipment, always useful on a military rifle and especially so in a rifle like the Norwegian Krag that must have gotten a lot of snow in the muzzle over the years.

The Krag, whether U.S. or Norwegian, cannot be reloaded with stripper clips, but it can be loaded with a round still chambered by merely flipping open the gate and dropping in a round. The ability to top up with rounds from a belt while keeping the weapon instantly ready was an excellent feature in a military rifle of the M1894's era, but it became a serious deficiency once stripper clips came into existence. Even though not being able to be loaded by stripper clips is no defect in a hunting rifle, any military rifle that requires single rounds to be fed to it is doomed to have a lot of rounds dropped in the mud or snow from cold-stiffened or frightened hands. I understand why the United States never modified the Krag action to take stripper clips (it adopted the M1903 Springfield early in the 20th century), but the Norwegians soldiered on with the Krag until the Germans invaded in 1940. Further, the Norwegians used a rimless cartridge from the beginning, which is easier to adapt to stripper clips.

One nice thing about the Krags manufactured in Norway is that they were made well into the 20th century when metal standards had improved. A 6.5x55mm Krag made in the 1930s is likely to be much stronger than an 1896 U.S. rifle. The Germans rechambered them for 7.92x57mm and used them during World War II, and no one can say that those German wartime loads are low pressure. If it will hold those loads, a person should be able to go even to .308 if he watches it a bit. Because there are a lot of good .308 rifles about, I suppose nobody needs to rechamber a Norwegian Krag to that

caliber and risk incurring a problem. It is better to just stick with 6.5x55mm and place your shots.

I think a Krag action makes the nicest sporting rifle in the world, especially if you go to a flush three-shot magazine. Every animal that walks the earth today has been killed with a cartridge that can be safely chambered in a Krag action. Such a rifle is the ideal sporting rifle in my judgment and is a joy to behold and use. As a military rifle of the period, however, the M93 Mauser, M91 Carcano, or Schmidt Rubin M89 is far better.

NORWEGIAN CAVALRY CARBINE (KAVALERIKARBIN M1895) 6.5X55MM

As I said, I like Krag actions, whether they are U.S., Danish, or Norwegian made. This little Norwegian carbine, much like the U.S. carbine version, is a wonderful weapon. It is light, handy, and very slick. However, because of the nature of a Krag action, it is not a good battle weapon—although the features that limit it as a war weapon make it a very fine hunting weapon.

This carbine has a magazine cutoff, as do many rifles of the period. Military thinking of the period held that the soldier would load the magazine up, set the cutoff, and then use the rifle as a single loader until the enemy was very close, at which time he would flip the cutoff and empty his weapon into the advancing hordes. I doubt that anyone actually did this in actual warfare unless under strict instructions and supervision by noncommissioned officers. Such battlefield behavior flies in the face of what people typically want when confronted with an emergency.

The safety on this rifle is a standard flip-type that typically is slow to operate, but in this case the fine fitting of the safety enabled me to flip it off quickly. I do not know whether it would be the same with other examples, but all the ones that I have tested have been very slick. The safety on this model is not as well placed as that on the Danish Krags, but the winged safety is surprisingly quick to operate.

The Norwegian Krag carbine is slick and light, but the sights leave a lot to be desired.

Unfortunately, the front sight is an unprotected pyramid type, and the rear is an unprotected, shallow U notch. The sights are extremely hard to see and use, and practical accuracy suffered accordingly. The sights are graduated from 100 to 2,200 meters, so at least the soldier could use the sights at typical practical ranges. I think the likelihood of any soldier using his M1895 Krag carbine at 2,200 meters is very unlikely, but I will say that I have heard of instances in Norway where the soldiers were up in the mountains and shooting across a wide valley to the mountains on the other side of the valley that was a mile or more away. In the crystal-clear atmosphere of Norway, with distinct targets outlined against the snow and with well-trained shooters, this may have been more effective than one would suppose.

The trigger pull is heavy, and this combination with hard-to-see sights results in

disappointing accuracy. The carbine is nicely balanced, easy to carry, and fairly light. Recoil is lighter than what you encounter with a U.S. Krag because of the differences between the 6.5x55mm and .30/.40 cartridges. Both cartridges give good penetration, always useful either in the game fields or battlefields.

The stock feels comfortable, and although the forearm had an odd look to it that reminds me of a weapon worn by saddle carry, it feels fine in the hand. It has a much more rapid taper and is not as wide or broad as the U.S. carbine stock. It looks odd to me, but results are what counts, and it did not handicap this shooter in the least.

No Krag actions are capable of being loaded with stripper clips, which is what caused the U.S. military to reject the Krag after battling Spanish soldiers armed with stripper-clip-loading Mausers. As noted earlier, the Krag must be loaded one round at a time, even though this weapon can be loaded with a round already in the chamber, something that was not possible with a Mauser. This ability to fire one or two rounds and then flip open the loading gate and keep a round in the chamber is a wonderful feature for the hunter approaching a wounded animal. But the possibility of dropping loose rounds in a military environment, plus the general slowness of the system, caused most military organizations to avoid the Krag after Mausers were developed. Only in Norway and Denmark, which had remained neutral in World War I, were the Krags retained—and the experience of both countries' militaries in World War II was such that this deficiency was not apparent.

As a military weapon, finally, this fine little carbine leaves a lot to be desired.

Portugal

HECKLER & KOCH 21—7.62X51MM

The Heckler & Koch 21 is an extremely lightweight machine gun that is suitable for the platoon or company level and is also a major-caliber squad automatic weapon.

The H&K 21 offers a weapon that weighs in at the squad automatic level, at 14 or so pounds, uses a belt for sustained fire but can take a box magazine, and has a rapidly changeable barrel. The barrel is heavy enough so that overheating is minimized even though it fires from a closed bolt. Additionally, it fires the 7.62x51mm NATO round rather than the 5.56x45mm round. This gives a better, longer-range gun generally.

Although the H&K 21 offers all these desirable characteristics, it remains unknown whether such a lightweight weapon that fires from a closed bolt can be used at the platoon or company level as an LMG. The H&K 21 does offer a fine if somewhat involved tripod that helps it in its sustained fire mode; however, when it is not fired off the tripod, there is no sense in denying that between its higher cyclic rate and lower weight to absorb recoil from long burst, the H&K 21 is not nearly as controllable as the MAG 58 or M60.

The H&K 21 has many similarities to the G3 rifle and also suffers from many of its failings. The sights on the H&K 21 are the

The Heckler & Koch 21 shown in the low position on the tripod.

same as the G3's, except that the rear sight is graduated to 1,200 meters rather than 400 meters. The sights are on the gun rather than the barrel, so a wise shooter tries all the barrels with the weapon to determine whether he has any change in impact when he switches barrels. The German tolerances are so precise that you are really pretty close, if not perfect, at longer ranges.

The buttstock on the H&K 21 is the same design as found on the G3: both lack a butt trap and have the same pistol grip and safety/selector setup. The safety is not positioned in such a way as to allow it to be flipped off rapidly. The H&K 21 is unique in firing it from a closed-bolt position. This means you can squeeze off the first shot from the H&K 21 very much the same as you do with the G3. Additionally, you can set the selector on semiauto and fire rapid semiautomatic shots the same as you would do with the G3. However, because the weapon is heavier, the recovery time is faster, and because the belt can contain more ammunition than the 20-round box, you do not have to break the rhythm of your shooting. When I first got my H&K 21, I tested it on chest-size metal plates at 300 yards from the bipod on both semi- and full-auto fire. I found that firing standard three-round bursts on full auto (which took quite a bit of attention to achieve as opposed to fast semiauto work) I was getting more hits in a 30-second period on the target in fast semiauto than I was on full automatic, although I was firing more rounds in the same period on full auto. Thus, for creating a beaten zone to deny the enemy access to an area, full automatic was better; whereas for

The H&K 21 LMG attached to a tripod can be carried as a rucksack on the back.

actually hitting defined targets at those ranges, I got better results in semiauto.

The H&K 21 has a box magazine adaptor, which allows the use of G3 magazines. Unfortunately, it is an extra part unlike the capability of the M249, which means (in my mind, anyway) that it will get lost in combat, which brings us back to using a "cheater belt," which is always a bad solution.

Barrels on the H&K 21 can be exchanged rapidly, and as long as you are somewhat careful, you should not burn your hand. It does not have a big handle on it like many barrels of the type, but it can be hit in the latch with the heel of the hand, cocked out at an angle, pulled to the rear, and dumped on the ground to cool. Thus, although it is not as good as the barrel on the Bren or M249, it is as good or better than the M60 barrel system. The test of barrel removal systems in my book is always this: Can I remove it and replace it while prone without getting off my belly? If so, then I am OK. I can do this with the H&K 21.

The H&K 21 barrel uses the standard G3 flash hider. It is OK but does nothing to control muzzle rise. Given the light weight of the weapon and the considerable recoil generated with the weapon because of its cyclic rate, a muzzle brake would prove useful. I fit a McArthur brake to my spare barrel.

Probably the worst two features of the H&K 21 are the loading mechanism for the belts and the cocking mechanism. Taking the last point first, the cocking lever is similar to the G3's except that the spring fitted to the bolt is much heavier, and hence the whole thing is much harder to operate. I do not consider myself feeble, but I cannot cock the H&K 21 while lying on my stomach and merely reaching up and pulling the cocking lever to the rear. Now, I normally would say that this is not a real problem—simply cock it before you lie down—but if you get a jam while firing prone and need to clear it, you have to pull the cocking lever back. I cannot do it lying prone. I can cock a Browning .50 M2, a MAG 58, an M60, or an MG34, but not an H&K 21. This is a bad point.

The second bad feature involves the belt loading. Most machine guns use a top latch and tray system: open the top latch, drop the belt in place, close the tray, and fire. This is not so with the H&K 21. Instead, you push the belts, upside down from the normal position, because the bolt is opposite the normal position in an LMG (the weapon uses the belts for MG3 or M60), into the feed tray. You push it in with your finger (unless you are using MG3 belts with a starter tab) until it clicks. You then rack the action twice to load it with a round in the chamber. Or if you start with the bolt back and cocking handle in the notch, you drop the bolt and then manually cock it once again. Given the spring pressure on the bolt as discussed earlier, neither system is particularly easy. Furthermore, as the weapon gets hotter, pushing belts into the receiver with your fingers gets to be less and less fun.

Because of the design, which was developed from the G3 rifle, the standard top latch assembly simply cannot exist. By the way, the belts for an MG34 or M42 in 7.92x57mm look as though they are the same as the MG 3 7.62x51mm belts, but take it from me, they are not. Apparently, there is a slight taper to them someplace, and my H&K 21 continually jammed when using what appeared to be belts identical to MG 3 belts, although they were actually MG 34/42 belts; and the weapon worked perfectly when I converted to MG3 or M60 links. Spare yourself a lot of time and use the correct belts from the start.

I am not sold on 5.56x45mm squad automatic weapons, but given a choice between an M249 in that caliber and the H&K 21 in 7.62x51mm, I think I would prefer the M249 because it is easier to cock, offers a box magazine carry without an adapter, and makes loading belts much easier and less painful. But I do like the ability to fire sustained semiauto fire at long range that the H&K 21 offers, as well as the power the 7.62x51mm provides once the range gets long and the wind gets stiff. Finally, with a suitable tripod, the H&K 21 can be used as a general-purpose LMG rather than a mere squad automatic.

Romania

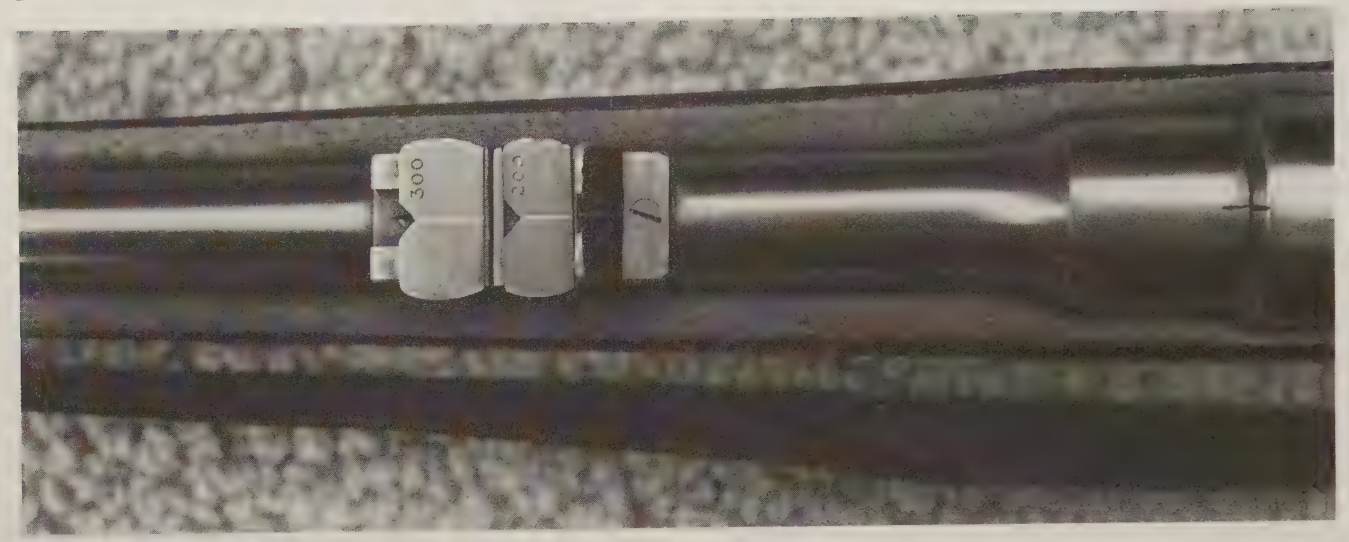
ROMANIAN MANNLICHER M1893 CARBINE 6.5MM

The test example M1893, serial number 12985, was made at Steyr's factory in Austria in 1894. When you consider that even today it is a fine little rifle, you realize that in 1894 it must have been really amazing. It can best be compared to an M1894 Winchester, which uses a tubular magazine and round-nosed bullets. This Romanian M1893 is equally as handy and uses a much better delivery system.

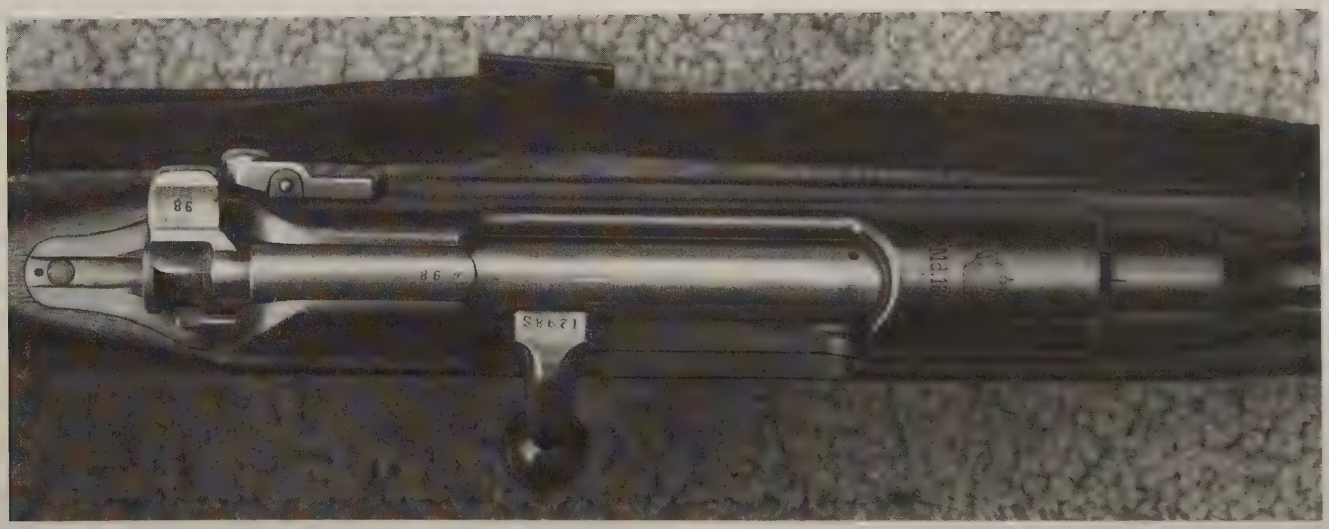
The test model had been English proofed, the military sights typically fitted with graduations from 600 to 1,800 meters, and a 500-meter battle sight replaced with a three-left wide V express style sight for 100/200/300 yards. The front sight had likewise been changed from a pyramid style to a bead atop a post. The bead was quite small, however, and the V very wide; I found it difficult to maintain proper elevation with the combination. The sight radius was short at 15 inches, and that also affects on-target performance. I was quite interested in this setup simply because I had read a number of early 1890s British hunting books in which the authors carried Romanian Mannlichers off to African hunting fields instead of British double- or single-barrel rifles. In its time, this weapon was the expert's choice of bolt-action rifle.

The Romanian M1893 rifle was frequently used by pre-World War I British sportsmen as a hunting rifle.

The weapon has the typical Mannlicher safety and trigger system, and the bolt handle (which is standard) is ahead of the rear section of the receiver, meaning that the shooter must reach farther forward to work the action than with a Mauser. However, Mannlicher actions are still slick, so even the extra reach is not a tremendous hurdle to cross. Although not as slick as a Krag, the



The test weapon shot by the author featured British replacement sporting sights with a fixed 100-yard leaf and folding leaves for 200 and 300 yards. Many M1893 Romanian carbines were modified for sporting use by British makers.



Top view of the receiver on the M1893 Romanian carbine.

Mannlicher action is light-years ahead of Mosin-Nagant.

The carbine has a cleaning rod slung under the barrel and no butt trap. It also lacks an upper handguard. For sporting purposes, where one to three cartridges might be fired, this omission is not terribly significant, but for a military weapon, it can be a problem. As someone who has burned his hand on bare upper barrels after firing 20 to 30 fast rounds, I am a big fan of upper handguards of some type to keep your flesh off hot steel.

The M1893 carbine is not quite full stocked, but it is light and very handy. Shooting from the off-hand and other positions is pleasurable, and the M1893 would make a fine companion for long walks in the wild places of the world.

This weapon has an 18-inch barrel. Therefore, report obviously is sharper than what you get with a 30-inch barrel, but the 6.5mm Romanian cartridge is not high

intensity by any means. Thus, although it is sharper in report, it is not a disorienting blast at all, and recoil is moderate. I could shoot long strings with this rifle in my shirtsleeves without any discomfort.

In 1883, the Romanian army had a rifle and carbine that were better than those fielded by the U.S. Army at that time. Likewise, the British hunter who modified an M1893 Romanian carbine to a sporter got a very nice bolt-action rifle when available bolt-action designs were very limited. Although I believe that a Krag action is a better hunter's choice, I would not say that the British hunter of the early 1890s who picked the Romanian M1893 was deprived in any way.

South Africa

MAUSER M1896 BOER WAR CARBINE—7X57MM

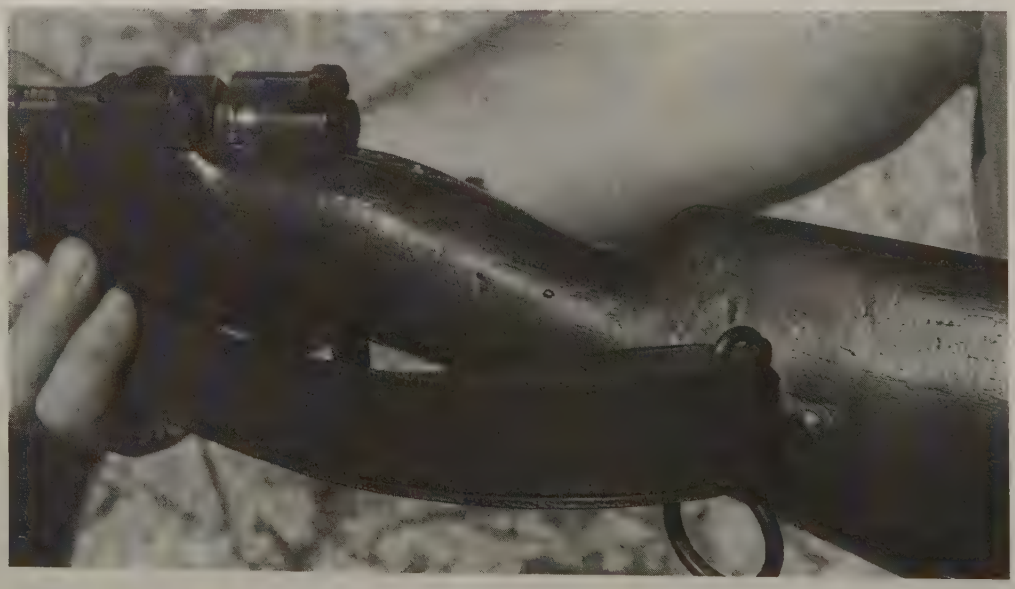
The Boer War was a very interesting war for a number of reasons. First, the British army had basically not faced a professional army since the Crimean War (and the Russian army was supposed to have been a much tougher opponent than ill-armed colonials). Second, the British army went into the Boer War thinking it could easily defeat the unorganized, untrained Boers but soon found out that men "with the bark on," as Frederick Remington would call them, who had been

South African Boer commandos with Mauser M95 rifles.

hunters for generations and were armed with modern weapons and fighting on their home ground, would prove to be formidable foes. Ultimately, the British had to take all the women and children prisoner, put them in death camps, and offer excellent terms to win the war. Had the Boers been able to send their women folk away, no doubt the war would have gone on much longer.

The Mauser M1896 carbine I tested was a very modern weapon when it was originally sold to the Boers. It used a stripper clip to load it, making it faster to load than the British Enfields at the time. It had a sling swivel on the side that tended to strike me in the cheek when I shot, but if I had I loosened the strap more or used a thinner strap, this probably would not have been a problem. The example tested (with a low four-digit number) was a captured Boer War piece in excellent

Boer commando checks the sights on his M95. Note that the sights in this photo are set at the 800- to 1,000-meter position.



The rear swivel on the M96 Boer carbine. Note the saddle ring underneath it. Although the rings rattle, a lot of horse soldiers apparently used them rather than scabbards to hold their weapons.

condition, obviously having seen little use.

The sights are the typical pyramid front, but without any sightguard, coupled with a low V-shaped open rear sight. Adjustment ran from 400 to 1,400 meters, but because the lowest setting was 400 meters, the rifle hit 24 inches high at 100 yards. This is typical of the European battle zero of the period and unsatisfactory in my opinion. It is better that you should be able to hit to POA at close range when time is short than to adjust at long range when the danger is lessened by virtue of the distance involved, if nothing else.

Many Mauser rifles are designed to remain open when the last round is fired; interestingly enough, this one did not do this, and it was possible to close the bolt on an empty chamber. When the carbine is fired slowly and on the range, it is obvious when you have an empty chamber because of lack of pressure on the bolt that would be caused by the friction of the cartridge being pushed forward; however, in a period of excitement, or with a less knowledgeable shooter, I could see this resulting in pulling the trigger on an empty chamber. It rather reminds me of an H&K G3 in that way. This is a bad feature on either rifle: the bolt should lock open when empty to alert the shooter to the necessity of loading.

The carbine uses a straight-grip stock with a thick wrist that I suppose was sturdy enough to withstand falls from a horse. If it did break, a few strips of green hide would be sufficient to hold it firmly in place until a more formal repair could be undertaken. The cleaning rod is only a short piece of rod and must be joined with others to make a rod long enough to clean the rifle, but at least it is something. A full-length rod would be better, and I certainly would like a butt trap to hold cleaning supplies, but it was absent on the rifle.

The carbine balances well in the off-hand, kneeling, and sitting positions. The action is quite slick and quick to use. The safety is naturally slow to operate and, frankly, I would simply ignore it and carry it on my horse with either an empty chamber or the bolt handle slightly out of position.

If I were faced with the choice of this rifle or a Lee Enfield carried by the British during this period, I would prefer the Mauser. It is lightweight, handy, flat shooting, and dependable. If the sights were adjusted to allow more practical results both in terms of range and quick acquisition, the M1896 would be a very fine battle rifle. Apparently, the Boers used to go to church on Sunday, and then after services while the women set out the dinner, the men would shoot their rifles off-hand at 100 meters at an egg (I assume a chicken egg). The first person to hit it won the contest. Obviously, holding 24 inches low as the battle sights on this carbine would require would not suffice, so I assume the Boers must have done something to alter their sights to allow holding on the target at that range as well as other practical ranges. Perhaps they replaced the front sight with a higher unit (the front sight did have a pin through it that would admit such replacement). If the sights were altered, I think I would be happy competing in such a match with this carbine even today.

Spain

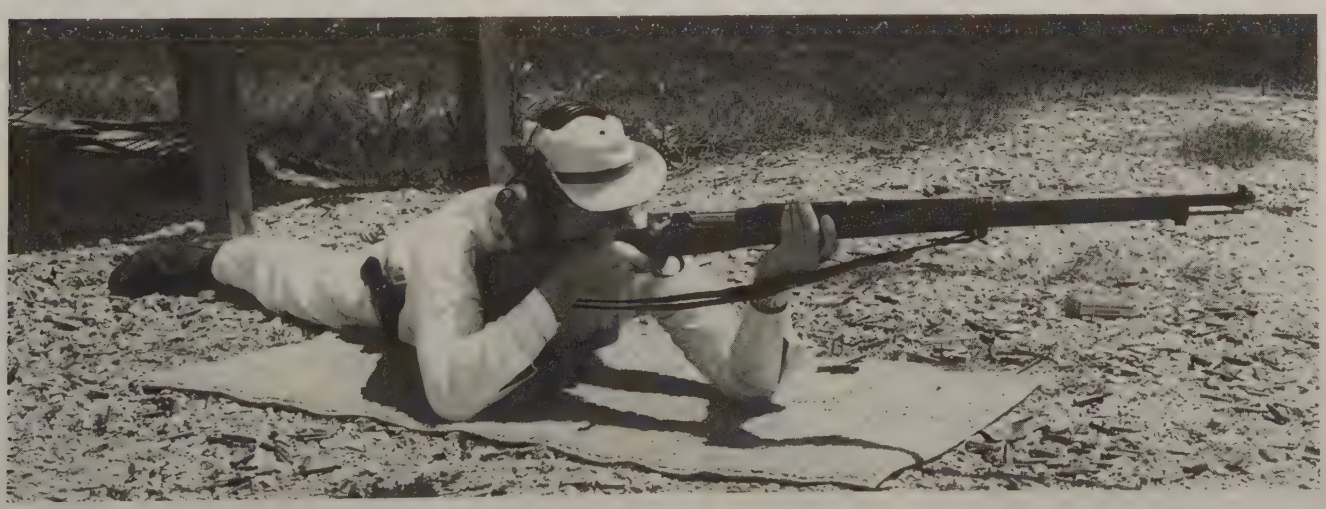
M93 SPANISH MAUSER—7X57MM

This was the rifle that convinced the U.S. Army that a service rifle needed to be a clip loader and proved without a doubt that black-powder military rifles were obsolete. This happened in 1898 during the Spanish-American War. Even though poorly led and ill-supplied, the Spanish troops inflicted many casualties on the U.S. forces that were, in the main, attributable to a better rifle.

The M93 Mauser rifle, unlike the carbine version also tested, is not cute or handy. Instead, it is long and clearly a military rifle. Accordingly, it was tested with no thought of sporting purposes or memories of fun days as a youth looking at short-barrel carbines.

The report is low because of the barrel length, and recoil is light. The 7x57mm cartridge is splendid from this standpoint, yet it has excellent ranging power, good penetration, and has been used all over the world to stop animals of all types. No one can doubt its efficiency on humans, yet it is much more pleasant to shoot than an 8x5mm rifle that is stocked the same way with identical barrel lengths.

The M93 has the typical Mauser winged safety, which is slow to engage or (more important) to disengage unless you carry it only in the halfway position. That still prevents firing but does not lock the bolt. Although I cannot flip the safety all the way through 180 degrees quickly, I can flip it 90



The M93 Spanish Mauser 7x57mm is a fine rifle that uses an excellent cartridge.

degrees with some speed. However, I still think the best way to carry these rifles is with the safety off and the bolt handle up. Merely closing the bolt allows you to fire, yet you get perfect safety. I find it much faster and more certain than attempting to flip the safety off even it is if in the 90-degree position.

The rifle is sighted for 400 meters, as is the carbine, and it suffers from the typical pyramid front coupled with a shallow V-shaped rear ramp graduated out to distances that today seem silly but before unit mortars and machine guns may have made sense. The designers should have allowed a closer sighting range as well. The sights are hard to see even in bright light, and it is difficult to keep the elevation proper. They are slow to use and would be much more so in the dark. The front sight has no wings or hood to protect it from damage, which I view as a drawback, although admittedly the front sight has been staked into position and, hence, is unlikely to shift from anything short of a very heavy blow. More critically, the lack of hood or wings causes the sun to shift the front sight differently at times, and this can cause you to get a different sight picture, thereby shifting your POI.

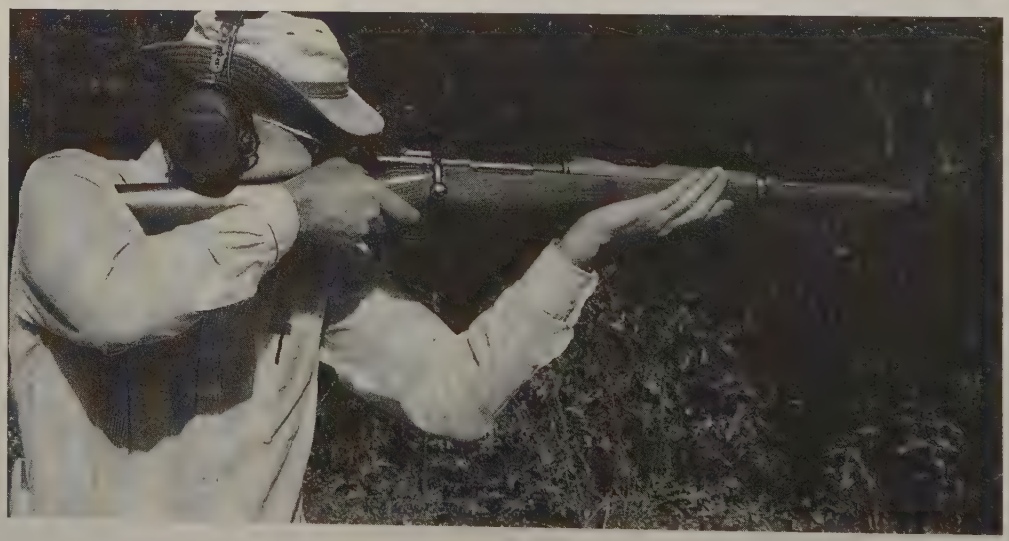
The stock is well made out of wood that today would be viewed as excellent for a commercial sporter. It is odd that, in the old days, peasant soldiers got better stocks than modern sportsmen do now. Overall, the weapon, which was built in a Spanish arsenal, is smooth in action. The rifle does not contain a butt trap for cleaning equipment, although it does have a cleaning rod slung under the barrel.

The long barrel of the rifle makes it muzzle heavy, and I found it difficult to shoot it well off-hand because it was tiring to hold. Moving the point of balance toward the butt would have resulted in a much more pleasant rifle to shoot off-hand. The problem is not so obvious in the kneeling or other positions. Groups were 3 1/2 inches at 100 yards but, as earlier pointed out, they were 15 inches high, betraying the 400-meter zero.

The M93 Spanish rifle is a fine rifle that uses an excellent cartridge. Although the action may not be as strong as on an M98, it is more than sufficient for the cartridges shot and will do anything you really need if you do not go crazy with your handloads. The M93 rifle does not thrill my heart like its carbine counterpart that I love, but it is a fine, sturdy rifle that taught the U.S. Army a valuable lesson and could be effectively used today to teach similar lessons under the proper circumstances.

M95 SPANISH CARBINE

It was during the Spanish-American War of 1898 that U.S. forces first learned about the efficiency of both smokeless powder and clip-loading Mauser rifles. As with most such



With the M95 Spanish carbine, the correct loads, and proper placement, a good shooter could take any animal in the world—from the elephant on down.

lessons, it was learned at the cost of men's blood. Spanish forces may not have been well led or supplied, but they were brave and did have the better weapon. The clip-loaded Mauser M93 rifle and carbine in 7x57mm wreaked havoc on U.S. forces, and to this day it remains a fine rifle in a good caliber. Bannerman had Spanish rifles captured in Cuba and Puerto Rico in his catalogs as early as 1900, in which he sought eager buyers who wanted the latest in military hardware.

Many people tend to look at the M93 Mauser and wrinkle their noses because the action is not as strong as the later M98. They are correct that the M93 is not as strong, but it is perfectly adequate for 7x57mm because it fires at a lower pressure than 7.92x57mm or .30-06. Accompanying this lower pressure is lower recoil, which is always nice for a rifle used by low-skilled soldiers. The caliber has an excellent ballistic coefficient, allowing superb penetration and low trajectory. The ammunition is slightly lighter round for round than 7.92x57mm or .30-06. It might well be likened to the 7.62x51mm NATO round, in fact, and no one has ever said it is short on power. I would note also that the 7x57mm has been used worldwide on game animals from elephants on down.

Spanish Mausers come in all shapes and sizes, but they all have certain common features. The stocks are wood and have a handguard both top and bottom, thereby protecting the hand. The stocks are strong through the wrist area so that they won't break when the bearer falls off his horse. All use solid-steel buttplates. Many of the rifles have cleaning rods slung under the barrels, and those that do not have them there have them jointed and in the butt under the trap. Sights are pyramid fronts, which are protected by sturdy wings, and V-shaped tangent rears, which allow for much more yardage than today's shooter is ever likely to use. However, when these sights were made, rifles frequently were also used as indirect-fire weapons, and hence they might have been shot at such extreme ranges as 2,000 meters. Carbines tend to have more realistic ranges on their sights.

The bolt handles are all smooth, which is important to allow rapid bolt manipulation. Some bolt handles are straight out from the stock. They tend to be faster because you do not have to reach down to get them. Others, especially those on carbines, are bent down along the stock, mainly to avoid the bolt handles from digging into the side of the horse that carries the rider and his carbine.

Trigger pulls are commonly a two-stage military affair with about a 6-pound final break. In comparison with common military weapons today, they seem light and allow good control of the weapon. Capacity is five rounds, and a stripper-clip guide straddles the receiver bridge, so rapid reloading is possible. The rifles all take a variety of bayonets, most of which are much longer than those encountered today, which are typically the length of a utility knife. Carbines frequently take no bayonets or much shorter ones. The rifles with barrels in the 29-inch range are quite pleasant to shoot for those of us accustomed to 18-inch barrels on H&K G3 rifles. Being shorter, the carbine will bark more but because of the intensity of the cartridge are still pleasant to shoot. The safety, being the typical Mauser wing variety, is safe and secure but slow. I do not think I would ever use it except in an ambush situation; I prefer to leave the safety off and merely finish closing the bolt handle when ready to fire. Only in an ambush, would this method be too noisy; otherwise, it is much quicker to get a rifle into operation this way than to attempt flipping off the safety. This is especially so if it is cold and wet outside when larger movements like closing a bolt handle can be done more easily than the fine movements called for in flipping the safety off.

As with any rifle, accuracy depends on a number of factors, the most important being the shooter, the ammunition, and the quality and condition of the weapon. With proper ammunition and a weapon in good repair with an unpitted bore, anyone who calls

himself a rifleman should be able to get three shots into 3 inches at 100 yards. Frequently, you can do better. It is always surprising to me how well many of these old rifles shoot—especially rifles that you know were probably last fired when Woodrow Wilson was president and have been banged around the world ever since. They still stand ready to deliver the goods after all those years of abuse and neglect—a lasting testimony to those who designed and made them. All of us should do so well if left in a musty South American arsenal for 70 years or more.

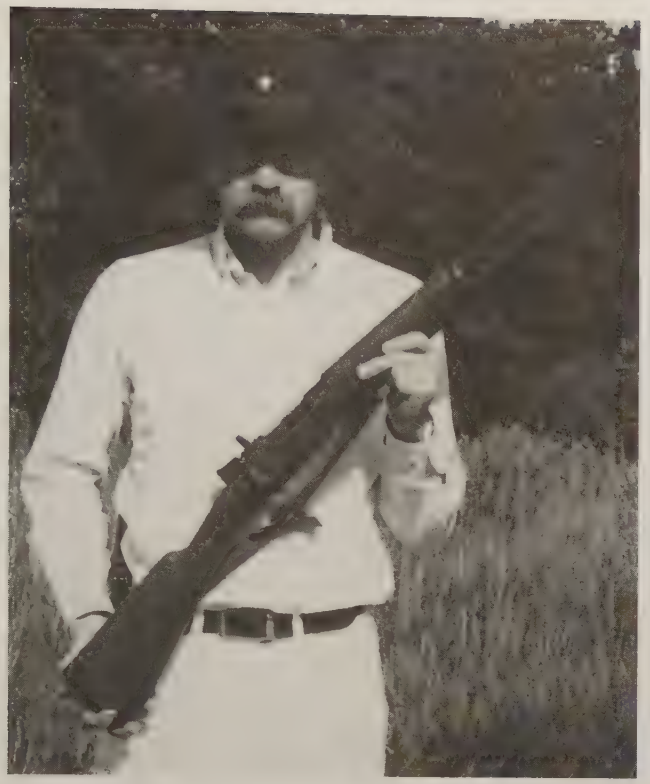
My test example was a carbine version. I first saw this weapon at a local discount store I visited with an aunt when I was perhaps 11 years old, and I immediately fell in love with it. It cost $10, a fairly sizable sum for an 11-year-old, but I could not get my aunt to tell the salesman at the store it was OK to buy it (in those far-off, more pleasant days, selling a rifle to an 11-year-old was legal as long as the child had the money and an accompanying adult agreed—no papers were signed, and no records were kept). By the time I got back to the store with my mother a few days later, the entire shipment had been sold. All the local deer hunters bought them because they were perfect for a cheap sporter, lightweight, short, with low recoil, but powerful, accurate, and terribly cute. The little carbine that I had fallen in love with had disappeared. I began looking about for another but could not find one. Finally 34 years later, I found it again. I confirmed my passion and consummated it with a $100 bill. My daughter may have to sell it off someday, but I will never part with it!

On the range, I found that my initial impressions had been correct: the M95 carbine is incredibly handy; recoil is light; the action is fast enough, although not up to Lee Enfield standards; trigger pull is not as good as a Remington 700 but is so much better than a lot of rifles that are made today that it puts them to shame; and, most important, it feels alive and balanced in your hands. I will admit the sights are hard for me to use; I find pyramid fronts and V-shaped rear open sights difficult for eyes trained on peep and telescopic sights to use. Perhaps a little widening of the rear sight (as I did on my AK-47 that improved it so much) and a dab of white paint on the front would help. I bought 5,000 rounds of fresh, noncorrosive, late 1970s or early 1980s FN ammo specifically to shoot through this weapon. I am sure I will learn its little tricks, but even with these sights, I can hit a fist at 100 yards easily and keep the rounds on a chest-sized plate off-hand and fast at 200 yards with almost every round.

As a Spanish soldier in 1898 Cuba, I would have looked with pity on those poor fools armed with black-powder Trapdoor Springfield M1873 rifles and even Krags. There was a reason 700 Spanish soldiers inflicted 1,400 casualties on the 15,000 Americans who attacked San Juan Hill, and this little carbine (and its bigger brother rifle) is it. This little 7x57mm carbine is about the dandiest weapon that I have ever seen that was made for the military. If I could find another, I would buy it too!

FR-7—7.62X51MM

Exactly what role the FR-7 was designed to play is unclear, as is when the weapon was made. Depending on whom you believe, either it was designed to supplement the CETME rifles coming into service in Spain during the 1950s, or it was designed as a training rifle for new recruits until they were further along in the training cycle. For whatever reason, the Spanish arsenals converted their Mauser rifles—some M95 actions but most like the one tested, an M98 action—into a very fine bolt-action rifle. They took the barrels off the rifles and rebarreled them in 7.62x51mm, shortened the barrels, added a flash hider similar to the one found on the CETME or G3 rifle, added a very clever cleaning kit, put on a front sight with protective ring that resembled the CETME/G3 front sight, turned the bolts down, chopped the stocks off halfway, and added a very



It is unclear exactly when and why the Spanish developed the FR-7. It has been theorized that it was developed sometime in the 1950s to either supplement the Spanish military's CETME rifle or as a training rifle to be used by recruits during their initial training.

By adjusting the drum, the shooter exposes the peep sight and he can then adjust it for different ranges. Unfortunately, all the settings are too high. Either a taller front sight or lower holes need to be used to get realistic ranges established.

interesting adjustable peep sight that also resembles the sight on the CETME/G3 and is clearly superior to the open, narrow V notch rear commonly seen on M98 Mausers.

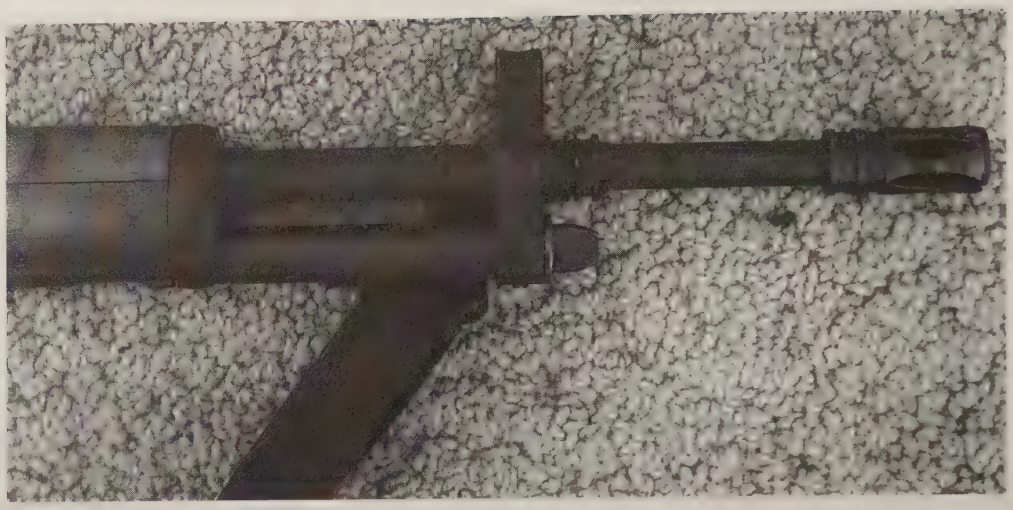
All these modifications made for a very nice, handy, light carbine that allows the shooter to familiarize himself with the CETME/G3 sighting methods. Whether all the work that went into making this conversion was worthwhile is debatable. I assume that you could almost make a new CETME/G3 rifle for the cost of the modifications, and apparently the Spaniards have concluded the same because they are selling off the FR-7 as surplus and not making any new ones. But perhaps making the FR-7 allowed them to keep various arsenals busy until tooling could be completed, thereby avoiding having to lay off skilled workers who might migrate to other fields and not be available later when needed.

The FR-7 tested, using Israeli surplus ammunition, placed three shots into 1 1/4 inch at 100 yards from a rest, which I consider very satisfactory. However, it was hitting about 20 inches high even with the sights on the lowest setting. The only solution to getting this weapon to hit at a proper zero is to raise the front sight or lower the peep holes in the rear sight dial. Why the sights were designed in this fashion is a mystery: certainly by the time the modifications were made, military men knew what effective battle ranges were likely to be for individual rifles.

The front sight is protected by an H&K style ring, which protects the front sight

from any damage except the intentional type. The front sight itself is a cone-shaped pillar. In my judgment, a simple square-faced blade would be better because these rounded cone-type front sights tend to have light reflect off them differently at various times, which causes shots to go wild.

The rear sight is a very clever peep unit and—other than the fact that its holes are too high, so the POI is 20 inches too high—is a very fine sight. It is rugged and not likely to get knocked out of alignment accidentally. It is also much easier to use than any sight ever placed on an M98 rifle by an arsenal or factory. The peep holes might be a little too small, especially at close range, for quick work or in darkness, but drilling the apertures out a bit would solve that matter at no cost.



This right front view of the FR-7 illustrates the well-protected front sights, the flash hider (which is handy with the short barrel), and various design features that give the Spanish rifle the appearance of the G3 rifle.

What appears to be the gas system on the FR-7 is actually a very clever and handy cleaning kit.

The FR-7 has the typical Mauser two-stage (plus heavy with creep) trigger and wing safety that is both slow to disengage and engage. Leaving the bolt partly open while on patrol or hunting is my solution to the former problem. Using that safety approach, I have found that I can spot a target, drop to one knee (closing the bolt as I do), aim at my target, and kill it at 135 yards within 1 1/2 seconds of spotting it. I think it is the safest and fastest way to use a Mauser-type safety.

The trigger pull frequently gets better with age and use, although sometimes modification by a trained person is needed. Thousands of snaps often help smooth it up, as well as lapping in the bolt and helping you master the trigger at the same time—and all at virtually no cost.

Although I think the FR-7 is an interesting

The FR-7 uses an action originally set up for 7x57mm cartridge. To assign the proper feeding of the shorter 7.62x51 NATO ammunition, a spacer is installed in front of the magazine. The tip of the knife points to the spacer block.

concept, I feel the Spanish designers could have taken the project two steps further and gotten a much better result. First, the German-style winter trigger guard should have been adopted. It may look funny, but when it is cold out and you are wearing mittens, you will be glad the trigger guard is big enough to accommodate your fingers. Second, the weapon should have been modified to accept a detachable G3 magazine. Had this been done, the potential of the weapon would have gone up tremendously because two of the M98's real failings—low capacity and the need to take the weapon out of operation to load it—would have been eliminated.

Balancing all the FR-7's drawbacks and strengths, I find the FR-7 a rather charming rifle.

Sudan

AR-10—7.62X51MM

Before there was the AR-15 (later called the M16), there was the AR-10. Basically, the AR-15 was a scaled-down model of the AR-10. Unfortunately for the designers, the AR-10 came on the scene after the FAL had been perfected and the M14 had been adopted by the U.S. military. Had it come out five to seven years earlier, things might well have been different. As it was, it still looked very futuristic when it came out in the mid-1950s. I remember seeing early reports on the AR-10 in *Guns* magazine from 1959 and thinking how interesting the rifle looked. In a world full of steel weapons with wood stocks, the aluminum receiver and plastic stock of the AR-10 were radical advances. Similarly, a 7-pound rifle in a time when the normal weapon weighed closer to 11 pounds was also a breakthrough. To anyone who has ever carried a rifle for long periods, the 7-pound AR-10 feels very nice.

One rather wonders what would have happened if the AR-10 in 7.62x51mm had been adopted: if it had been adapted to accept the 7.62x39mm cartridge, would the 5.56x45mm rifles ever have gotten off the ground? Frankly, my recollections are that representatives of the AR factory were on a tour of South Asia at the time and had taken both the AR-10 and the AR-15 with them to show various military people. The smaller and lighter AR-15 was preferred by the people in

The AR-10 in 7.62x51mm did not sell well because militaries preferred the lighter and smaller AR-15.

The flash hider on the AR-10 works well but does nothing to dampen recoil and hence improve hit potential on targets. The sling also has a tendency to hit the plastic and make noise. It needs to be taped down before using the weapon in the field.

Asia, as might be expected, and the factory basically started putting all the emphasis and development on the smaller weapon. The rest is history.

A few AR-10s were made, however, and some were sold in Sudan, Burma, and a few other areas. Such was one of the weapons that I tested for this book. It was a so-called post-May dealer sample. The weapon was in good internal condition, but somewhat battered on its exterior.

I did not have an opportunity to test the weapon at long range, but I see no reason to believe it would not do as well as its identical companion when it is fitted with a match-grade barrel and shot into 1/2 inch at 100 yards with good ammunition. Certainly, we have seen in the past few years that AR-15s are capable of quite amazing performances, especially considering that originally all of us thought they were mere bullet hoses.

The first thing one notices when picking up the AR-10 is how light the weapon is in comparison to the FAL or M14. This caused me to have some concern about the recoil because the flash hider on the muzzle did not seem to be designed to minimize recoil, merely to arrest flash. However, I was pleasantly surprised to find a very light recoil impulse upon firing. Interestingly enough, however, I could not feel the spring in the stock in operation, whereas I always can hear and feel it when shooting an AR-15 or M16.

The front sight is a nicely shaped blade that reminds me of the blade on the new M16A2 rifle. Clearly, it is superior to the AR-15's early front sights. The rear sight is adjustable for both elevation and windage, and until the recent AR-15A2 or M16A2 variant was released this sight was superior to those found on AR-15s.

The controls on the AR-10 all fall nicely to hand, much as they do on the AR-15. They are well positioned for easy reach and rapid use as long as the shooter is right-handed. If you are left-handed, the safety is awkward, and the magazine release is not as good, although it is at least usable. The grip feels good, and the forearm is better shaped for the human hand than the triangular furniture found on the early AR-15s that did not fit a human hand.

Unlike the AR-15, the AR-10 uses a cocking handle on top, and the things that look like a spare trigger are actually the bolt-cocking piece. It can be cocked by either hand and can be easily pulled even with mittens. No bolt-closing device exists, but that is a bad idea anyway.

The safety is located in the same position as on the AR-15 and is both easy to use and convenient. Unlike the AR-15's safety, however, the AR-10's has the middle position as the safe position. You push forward to put it in full auto and to the rear to put in semiautomatic. Of course, this means that you must push it through the safe position to full auto, but you also avoid the risk of inadvertently flipping the safety through semiauto into full auto when you push the safety mechanism too hard, thus firing more rounds than you anticipated.

This brings us to the biggest problem with the AR-10: its ability to fire bursts. Despite the straight-line stock and what feels like a very low recoil impulse, the AR-10 is, in fact, uncontrollable in hand-held automatic firing. I tested the weapon with 20 rounds fired in two-shot bursts, which I found I was capable of firing quite easily, and then tried the same trick at the same distance with fast semiauto fire. I stood 10 yards away from the man-target, using the off-hand position and an aggressive stance. Despite this, the first round of the burst would hit where aimed, and the next round would go completely off the paper. This is unacceptable performance; all it does is waste ammunition that takes too much effort to transport to the field. Much better results were obtained when I fired fast semiauto fire. I simply pulled the trigger each time the front sight settled back on the target after jumping up in recoil, and I was able to rapidly place 20 hits on target.

What the AR-10 needed was to delete its full-auto capability and not try be a squad automatic. The FAL and M14 all tried to be squad automatics, and they failed because of excessive dispersion. As battle rifles, they were fine but they were heavier than the rifles they replaced. On the other hand, the AR-15 weighs less than the rifle it would have replaced and is only slightly heavier than the M1 carbine. which was limited in its popularity only because of its cartridge. A weapon weighing the same as the M1 carbine but packing the blow of the M1 Garand is something all true infantrymen seek, and the AR-10 just might have supplied it had the designers not gotten confused about what the weapon needed to do.

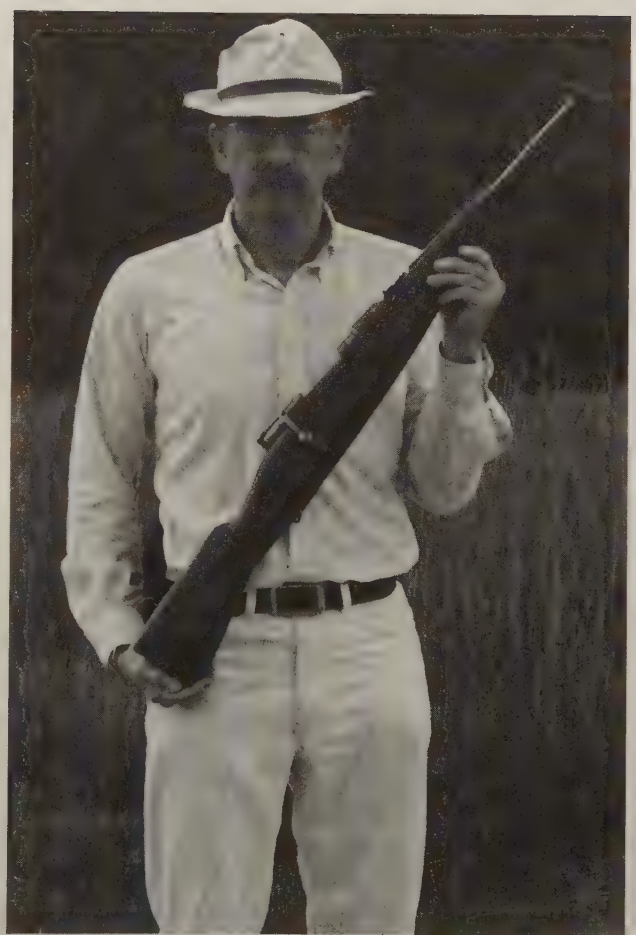
I rather like the AR-10, but then I like the AR-15 A2. The only real criticisms that most people have about the M16A2 are that the buttstock breaks and the ammunition is not sufficiently powerful. With the AR-10, at least you solve half the problem.

Sweden

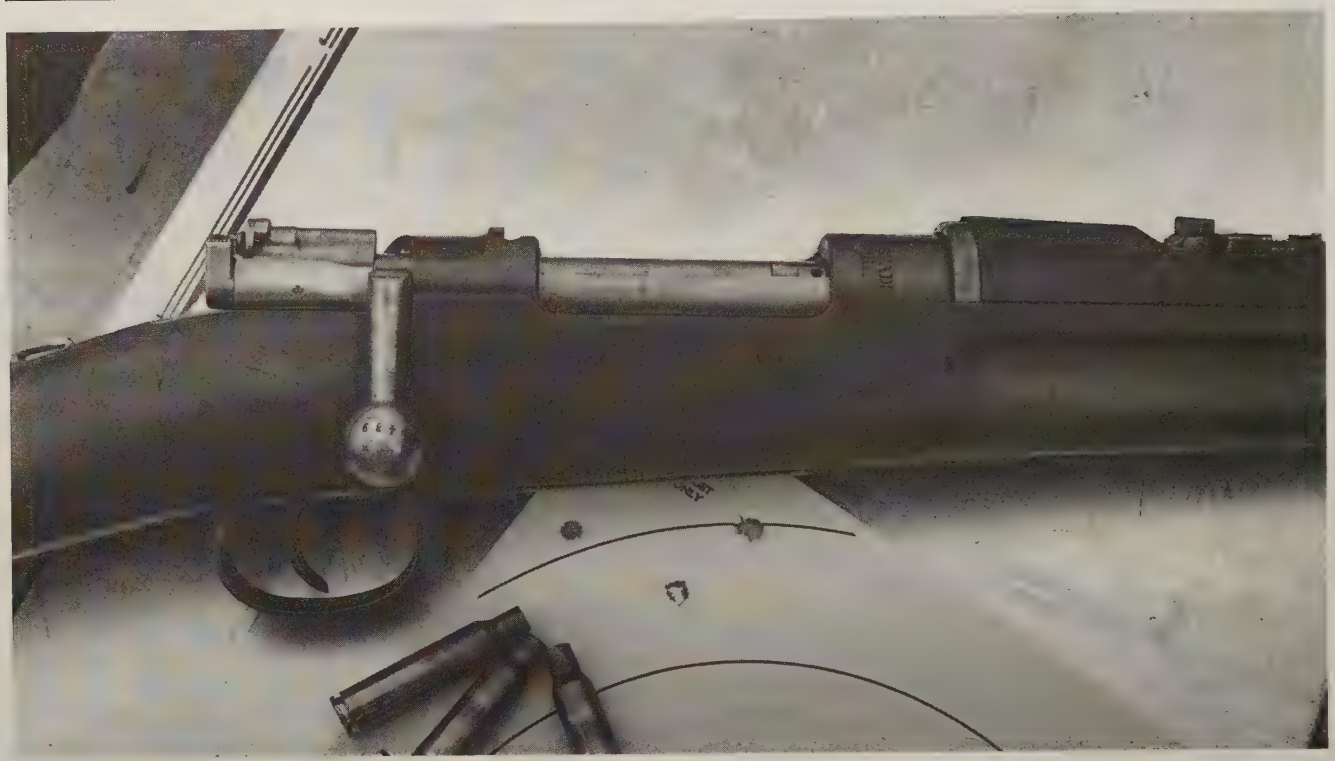
M94 SWEDISH 6.5x55MM CARBINE

These carbines are very much like the M93 Spanish 7x57mm carbines in every way. They are small, light, and, within limits, very powerful. At one time, they were quite plentiful in the United States, but since they were imported in the early 1960s, they have disappeared. I fear a lot of people liked them as cheap deer rifles or used them as the basis for sporters. Most of them, unlike their Spanish counterparts, have lived a quite peaceful life, and they typically are found in excellent conditions. The one I tested was made in Sweden in 1918 and looked like it had left the factory the week before.

These rifles, like their Spanish cousins, have their sights set for 400 meters and will adjust to 1,600 meters. Why anyone thought these carbines would be used at such distances even in 1918 is a mystery to me, and the only result is high shots at any practical range. A higher front sight is needed or, better yet, a large peep rear sight positioned 3 inches high at 100 meters would satisfy my needs for this weapon. As it is, you must aim at the knees at 100 meters and the low chest at 200 yards, and you are finally on at 400 meters. If you hold on at 100 yards, you are very likely to shoot over the enemy's shoulders. I often wonder how many soldiers went home to be grandfathers because of these 400-meter battle zeros.



The M94 Swedish 6.5x55mm carbine is much like the M93 Spanish 7x57mm carbine. They are both small, light, handy, and reasonably powerful.



The three-shot test fired by the author with the Swedish M94 carbine.

Off the bench, the steel buttplate and recoil seemed stiff, but once I went to kneeling, sitting, or off-hand position, the recoil became a mere slight push. Nobody could be bothered by the recoil. In fact, I rather think the Swedes had the right idea back in 1894 with the 6.5x55mm or similar cartridges. They recoil less than the 7.62x51mm yet deliver better field performance than the 7.62x39mm or 5.56x45mm.

The bolt works very smoothly, as is typical of well-made Mauser rifles. Such actions are never as fast as Krag or Schmidt Rubins but are so much faster than Mosin-Nagant or French Lebel rifles that they seem like greased lightening in comparison.

Even with the pyramid front sight and shallow V-shaped rear, I was able to get a 1 3/4-inch group at 100 yards from a rest with the carbine. If I owned one and did not want to go to a peep like the one I installed on my Spanish equivalent, then I would add a dab of white paint on the tip of the front pyramid and widen the shallow V, which would do much for improving the weapon's practical accuracy. Doing that on my AK-47 proved to me the difference between a rifle I could to shoot well and something that threw bullets all over, depending on how much of the sight I could distinguish at any given time.

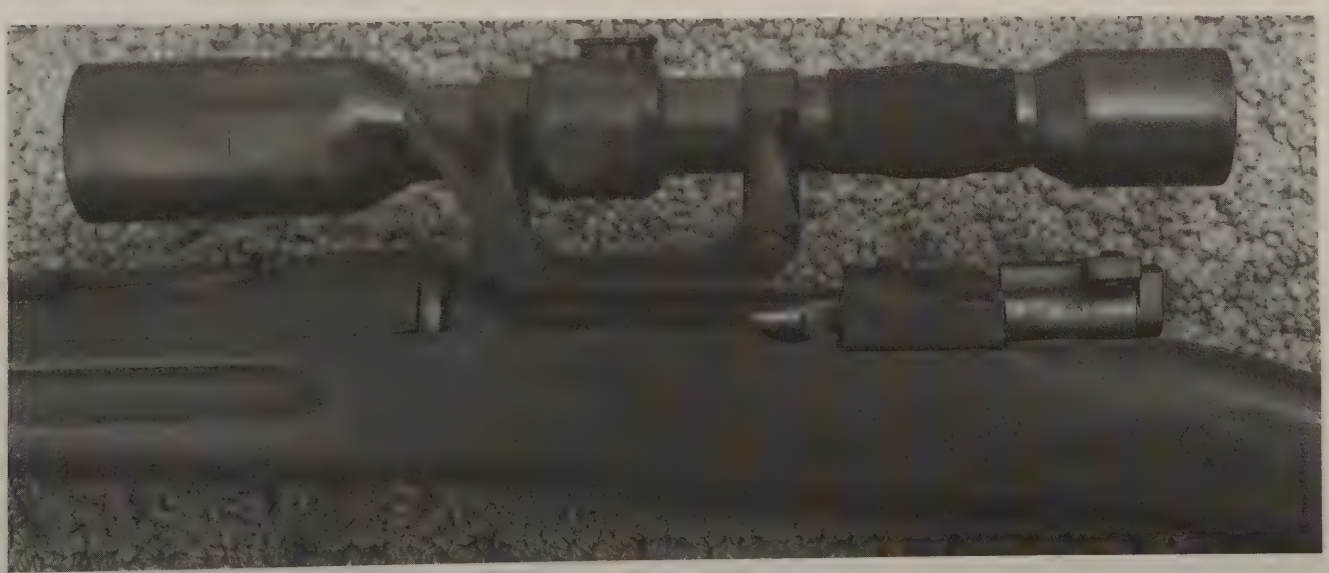
Interestingly enough, the carbine's barrel gets very hot even with a limited number of cartridges fired, as does the wood. Obviously, the barrel is light and transmits the heat to the wood. I do not suppose you could ever light up the wood from the heat on an M94 carbine as you can with an AK-47, but it would be interesting to try. Since you must hold the stock when you work the bolt, you tend to notice the heat on the forearm more than you do on an AK-47, where the weak hand is a mere rest for the forearm. Grabbing it to counteract the bolt opening means that you are firmly holding the very hot forearm. This is not the best for comfort.

The trigger is the typical two-stage military pull. After pulling up the stack, it broke very crisply thereafter. The safety is the typical two-

position Mauser, and I for one cannot ever flip it off quickly for brush shooting. Generally, I merely leave the bolt slightly ajar and close it when ready to shoot. I would use the same technique if I took an M94 carbine to the field.

The Swedish M94 carbine is a cute little rifle. I find all of these short-barreled weapons handy, although I must admit that their longer brothers tend to allow better shooting because of increased sight radius and less muzzle blast. Still, if I had to pick, I would no doubt select the M94 carbine over the longer rifle.

This Swedish M41 rifle in 6.5x55mm with 4X scope was made in 1902 and later modified into a sniper rifle for the Swedish military.



The scope can be removed rapidly on the M41, but the zero still has a tendency to shift.

The locking device on the M41 sniper mount locks the scope down tightly, but the zero still shifted in the author's test.

M41 SNIPER—SWEDISH 6.5MM

This rifle is a standard M96 rifle built in 1902 that was later selected to be modified into a sniper rifle for the Swedish army. The weapon I tested was virtually new. If it had been shot a total of 100 times, I would be surprised. When the Swedes picked this example to build into a sniper rifle, they selected a good rifle.

Using surplus 1960s-dated military ammunition, I was able to get a 1-inch group of three shots from a rest at 100 yards. I would have been pleased to get such a result with a brand new commercial rifle using Federal Premium ammunition, so you can imagine how impressed I was with the M41's performance.

The M41 had a quick-detachable scope mount that seemed to be very yet also allowed the scope to be quickly removed. Unfortunately, when I tested it, I learned that taking it off and then replacing it caused the POI to shift. In the test example, this shift resulted in a 2-inch shift up and to the right. It still shot a 1-inch group, however. The lesson, I suppose, is not to remove the scope from your rifle once it is sighted in. Frankly, I never think removing a scope and then replacing it without test-firing is a good idea. Rarely will the scope go exactly into the same spot, and just a little difference will throw you way off at 600 yards.

The M41 is very long and heavy, which makes it difficult to shoot off-hand or even from the kneeling position, because the balance is muzzle heavy in the extreme. Recoil, however, is accordingly light, as is muzzle blast. I did not fire it at night but saw no signs of muzzle flash, although a flash hider can be fitted to the M96 if desired. The trigger is the standard military unit with double pull and standard weight. I found that odd because the key to good shooting is a good trigger pull. Perhaps the Swedes found that from a rest the trigger pull may make little difference. Generally, the steadier the position, the less important a good trigger becomes.

The M41 retains the standard M96 rear and front sights with all the problems they present, to be used in the event the scope becomes disabled. They consist of the standard shallow U rear and pyramid front. Generally, I find such combinations difficult to use, but, for some reason, with the M41, I am able to hit a 10-inch plate at 300 yards from the kneeling position without difficulty.

The comb of the M41 stock is too low to use properly because the scope was designed for iron sights. The designer should have put a cheekpiece on it, as the British did with the Enfield sniper rifles. The safety also remains standard and is hard to engage or disengage promptly because it nearly abuts the rear of the scope. As a consequence, there is little room for the finger to hold on to while moving the safety on or off. Additionally, the right hand tends to hit the rear of the scope

The test target shot at 100 yards with a 90+-year-old M41 Swedish Sniper rifle, a 50+-year-old scope, and 40+-year-old ammunition. Given these factors, this is not a bad result, but as is obvious here, the scope should be mounted lower for better results.

when rapidly moving the bolt. Naturally, stripper clips cannot be used to load the weapon, resulting in having to load the rounds one at a time into the magazine. In the winter months in Sweden, I imagine that rounds are frequently dropped into the snow. Proper sniper rifles should have detachable magazines so that they can be quickly loaded, or the type of ammunition changed, without the shooter having to open the action and fumble with loose rounds.

The scope reticle has an odd pattern, which cluttered the field of view, and I had to see my target around the reticle. At 300 yards it was not a great problem, but became one for man-targets at 600 yards. The scope itself is of fixed power, but apparently had a bullet compensator built into it. One could raise the POI by dialing it up to 800 meters. Oddly enough, the rifle shot way low for me, and I had to put the drum on 600 meters to get it on at 100 yards. The drum could be recalibrated, but that requires a special tool. The scope was at least 50 years old, and it is obvious that light-gathering capabilities have improved much since this weapon was made. The target appeared grayer through the scope than it did with the naked eye. Thus, even though the M41 shoots as well as many modern sniper rifles, its scope is inferior to modern scopes. In good light, it made no difference, but I imagine that a modern scope would give you a full 30 extra minutes more of shooting at both ends of the than would this unit. Gaining that extra 60 minutes at the two most critical times during the day is what 50 years of development has given us.

Overall, the M41 is heavy and ill balanced, and it is difficult to use other than when shooting off a rest. The scope is cluttered and too dark. Although the rifle itself is accurate and pleasant enough to shoot to be considered

The AG42B shoots well once you figure out how to load it and if you do not mind the muzzle blast.

impressive as a fighting rifle, it falls short of the best on several critical areas.

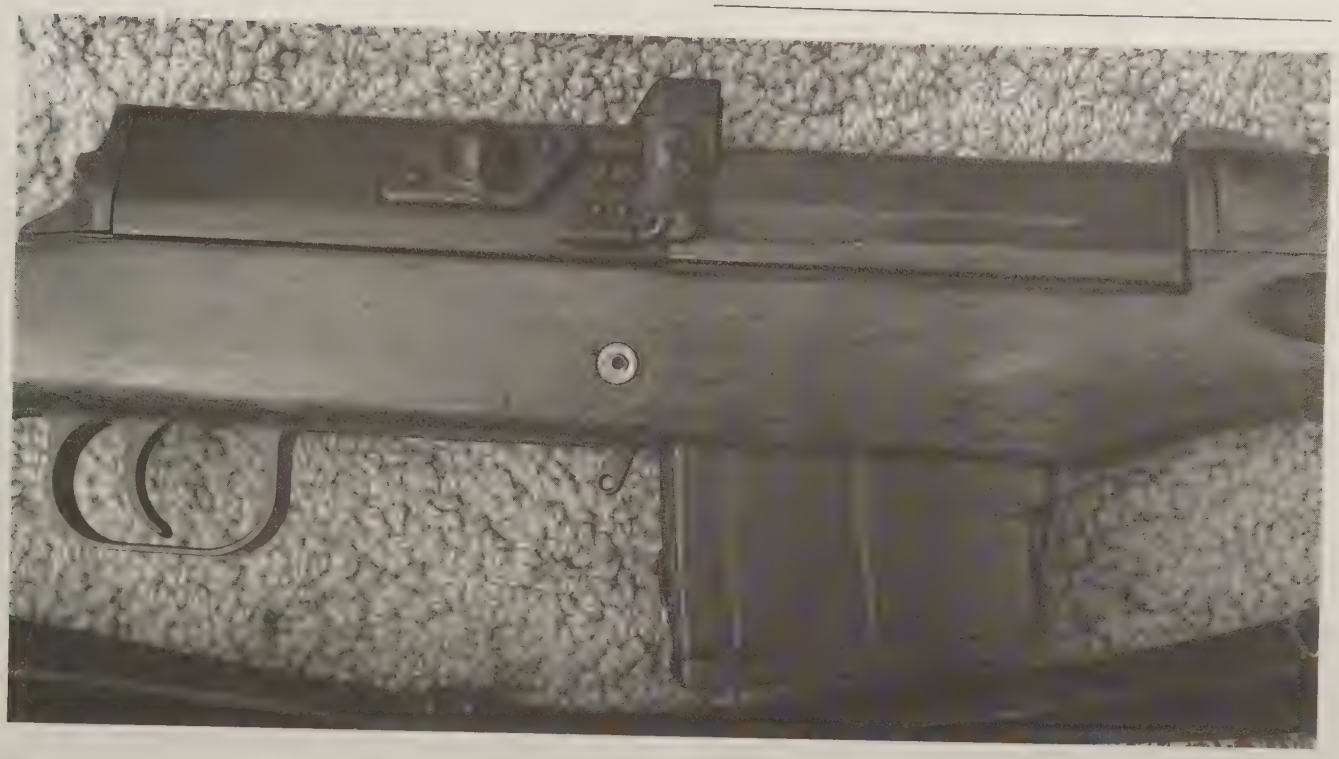
LJUNGMAN (AG42B)—6.5X55MM

This rifle was the answer to Sweden's desire for a semiautomatic rifle in World War II. Obviously, the Swedish designers saw the United States adopt the M1 Garand and the Germans and Soviets the various semiauto rifles and wanted something to equal them. During the war, Sweden was in a rather bleak position with the Russians in Finland and the Germans almost everywhere else in Europe. All Sweden could do was prepare its defenses and try to be useful enough to the Germans to pacify them but not supportive enough to provoke the Russians into attacking Sweden. Sweden's leaders recognized that it had to walk a very thin line, and it was one they thought the AG42B rifle would help them maintain.

The first thing one notices on the AG42B is that it has no cocking handle, so how is a round chambered? Certainly, pushing back on the smooth side of the bolt cannot be the answer, since your fingers will slip when they encounter the strong bolt return spring. After looking about, you discover that you must push on the lugs on either side of the "dust cover." Push forward and cover the bolt and then pull the dust cover back, and it pulls the bolt back. Insert a loaded magazine into the weapon and the bolt automatically closes. This system offers the advantage of not having anything to catch on vines or trees, but you also have nothing to push or kick on to pull a round from the chamber. Having kicked empties out of my M14 rifle, as well as my AK-47, I must say I rather like being able to kick a cocking handle to encourage a case to come out. But the M16 lacks such a feature and has proven to be workable, so perhaps I am too picky.

The AG42B is long and shaped much like the M96 Mauser rifle that was the standard service rifle at the time. This may have been intentional on the part of the Swedish designers so enemy snipers would not be able to determine readily which soldier in a squad had the semiautomatic rifle. Apparently, the Swedes issued one or two AG42B rifles per infantry squad. Really, though, I think it was shaped that way because of tradition not design.

The AG42B does have a cleaning rod slung under the barrel, a feature I like on military rifles. The barrel has a muzzle compensator built into it, and it appears to work well: when it was being shot, the rifle seemed to pull itself forward, not backward. The downside to this



The small trigger guard on the AG42B is odd on a weapon used by the Swedish military.

The action on the AG42B shown half cocked.

compensator is that it produces a lot of blast that is felt by the shooter. In a dusty climate, I am certain it would also kick up a lot of debris and maybe even light up at night (most compensators do), although I did not get a chance to try this one at night.

The safety system on this rifle was copied on the Rasheed, and it is slow to engage and disengage. It can be used by a left-handed person, but everything is backward. The grip on the rifle felt big in my hands, and my fingers spread on the pistol grip when trying to hold it. The trigger action is poor, being heavy and stacking a lot.

The weapon uses a 10-shot detachable magazine, but as with the German K-43 and Russian M38 or M40 rifles, it was designed to be reloaded with stripper clips via the guides into the magazine. The magazine on the AG42B is very difficult to remove and clearly was not designed to be reloaded by jamming a freshly charged magazine in place.

The sights on the weapon consist of a blade front sight that is well protected and a shallow U-notch open rear that is not protected by any wings. It does have a rather nice adjustment device that is easy to see and use. It has no winter trigger, and the trigger guard is not big enough to be used comfortably with mittens, which is odd considering the climate of its country of origin.

The wood stock got hot when 40 fast rounds were fired, and I imagine a person could set it on fire with a couple of hundred rounds fired rapidly. I know that will do it with the lower intensity 7.62x39mm round in a wooden-stocked AK-47. The metal rear sling swivel rattles on the metal sling attachment point and clearly fails the "jump test." I assume the Swedish army issues tape for the purpose of silencing such noises. In the U.S. Army, we always had to steal tape to do it.

Although it may appear that I did not like the AG42B rifle much, it did shoot fine. I found the 10-inch plates at 300 yards to be easy shots for the rifle, and I could make repeat shots rapidly. Long and heavy, the AG42B no doubt helped bridge the gap between the M21 BAR and the M96 that the Suomi M37/9 SMG could only fill at ranges up to 200 yards. Of course, it was obsolete by the time it was fielded and had enough oddities in its design to cause any thinking person to dump it for a better rifle such as the MP44. But I must admit it did shoot well in my hands, which is always an endearing trait.

Switzerland

SCHMIDT RUBIN M11—7.5MM SWISS

When you first pick up an M11 rifle, it feels very long because of its long action and barrel. For those of us accustomed to 16- to 20-inch-barrel weapons, the M11 just seems "long." When you dry-fire the weapon, the straight-pull action seems odd or unusual, but nothing much else. Firing this rifle is actually a perfect example of why it is so critical to shoot each of these weapons: it was not until I actually shot this rifle that I discovered why it is so good. By merely dry-firing it or handling it, I never would have discovered what a great rifle the M11 is. It rather reminds me of the Roth Steyr 07 8mm pistol in that regard: until you actually test it as a pistol is to be used in combat, you do not realize that it is one of the world's great guns. So it is with the Schmidt Rubin M11 rifle.

The long barrel of the rifle makes off-hand shooting somewhat more difficult than would otherwise be the case because the balance point is forward. Yet despite the long barrel, the rifle is not terribly ill balanced. The long barrel keeps the muzzle blast of the 7.5mm Swiss round (which is equivalent to a .30-06) to a minimum and also reduces muzzle whip. Because of the rifle's weight and its distribution—coupled with the stock design—recoil is quite low for the caliber used. I found that I could rather easily hit 10-inch plates firing off-hand at 200 yards and similarly sized plates at 300 yards from the

The Schmidt Rubin M11 is an excellent rifle, and anyone who is interested in a high-quality bolt-action rifle that is capable of firing rapidly at targets would do well to evaluate this system by actually firing one on the range and not merely playing with one in the gun store or show.

kneeling position. After doing so well, I tried my luck in the prone position at 480 yards (the sights were adjusted to 400 meters), and I found that I was getting hits about 50 percent of the time on my 10-inch plates. That is good work in my hands.

The author's test target shot at 100 yards with the Swiss M11. The safety is operated by turning the cocking piece (the large ringlike device) counterclockwise to apply the safety.

The front sight is a blade rather than the typical European pyramid front style. The rear notch is surprisingly easy to pick up, because the blade allows a good strip of light to be exposed, unlike with the typical pyramid sight. Unlike the case with many European rifles, I was able to quickly and consistently pick up the sights on the M11.

The safety is applied by turning the round-cocking indicator to the side. Doing so also locks the bolt. After much experimentation, I could not find any way to quickly flip the safety off, and I fear that it would fail my standard test for safety designs: Can I flip it off in time to hit a flying clay bird? But it did seem very certain, and, given the cocking indicator, anyone should be able to tell at a glance (or a feel at night) whether or not the weapon is ready to fire. The large ring in the indicator should allow the heavily gloved soldier to handle it without slipping, which is always a good point. The trigger guard seems somewhat small for mittens, and the trigger guard on the STG 90 rifle, which folds to the side for winter use, is much better.

The trigger pull is a typical two-stage process, with the second stage leading up to a fine, crisp pull. The magazine holds six rounds and is detachable. Such magazines allow for unloading the rifle without running ammunition through the rifle (always a dangerous practice in the best of times) and does offer the opportunity to develop 20- to 25-shot magazines for the rifle. The Schmidt Rubin M11 action is long in comparison with the Mauser, and straight-pull actions have been condemned over the years for lacking camming power to either withdraw oversized or dirty ammunition or seat rounds into dirty actions. Obviously, the Schmidt Rubin has never been tested in a war, and I have no doubt if it had been subjected to the mud of World War I France, the beautifully machined bolt might have suffered because of its fine machining and close tolerances. It would be sad to see. However, there are lots of places for military rifles besides the muddy trenches or sandy deserts. For the Swiss, who had a well-trained army, good machinists, and no aggressive war plans, the Schmidt Rubin made sense.

The best thing about the M11 is its bolt action. Although you do not realize it when dry-firing it, the M11 is a very fast action to use, as you discover immediately upon firing it. Merely pull the bolt all the way back and then push it forward. The bolt can be pulled back while the weapon is in recoil and pushed forward to get the weapon down and

This view of the M11 with the bolt open and fully to the rear shows clearly how the system works.

From this top view you can see the receiver length, stripper clip guides, and the quality of the machining.

realigned. With a typical bolt action, four strokes are necessary to withdraw an empty and load a new round. With the Schmidt Rubin M11, only two strokes are needed, so it is very fast. In my tests, it got faster results than those achieved with a Lee Enfield or my favorite M700 Remington that now has had more than 15,000 rounds rapidly run through it, lapping in the bolt and honing the action for rapid fire.

Shortening the barrel (as was done with the M11 carbine and K31 rifle) would offset the balance problems mentioned earlier, and though some greater recoil and blast might result, the improved balance in off-hand shooting would compensate for it, I believe.

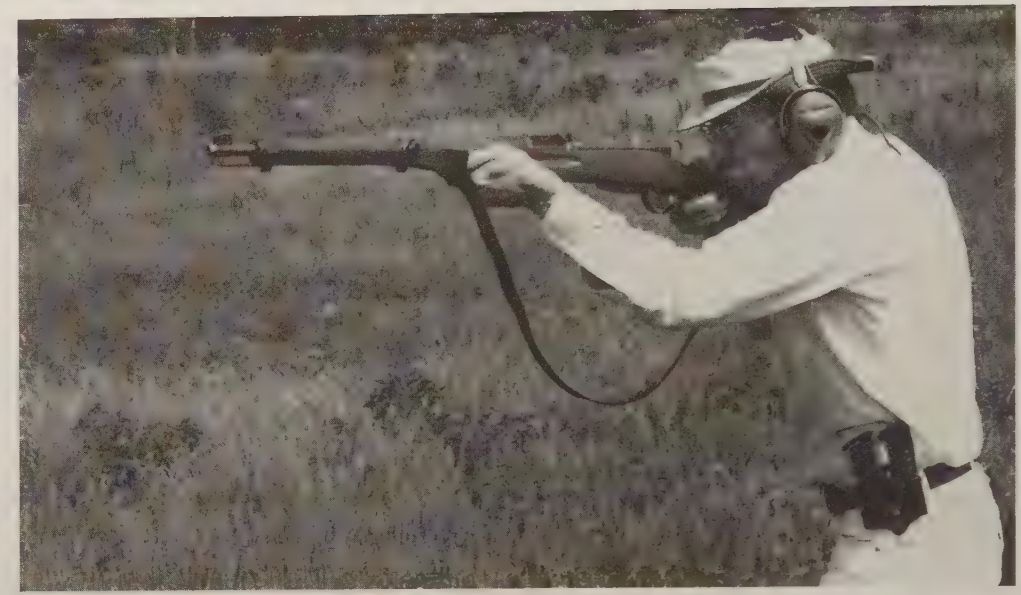
I was so impressed with the M11 that I immediately set out to find a Schmidt Rubin that I could justify into making into a shooter, rechambered to .308 caliber and fitted with a forward eye relief scope. Simply put, these are excellent rifles, and anyone who is interested in high-quality bolt-action rifles capable of firing rapidly at targets would do well to evaluate this system by actually firing one on the range and not merely playing with one in the gun store or show. As long as you can keep the actions out of the mud and use good-quality ammunition, I cannot imagine anyone would be disappointed with a Schmidt Rubin M11 rifle.

K31—7.5MM SWISS

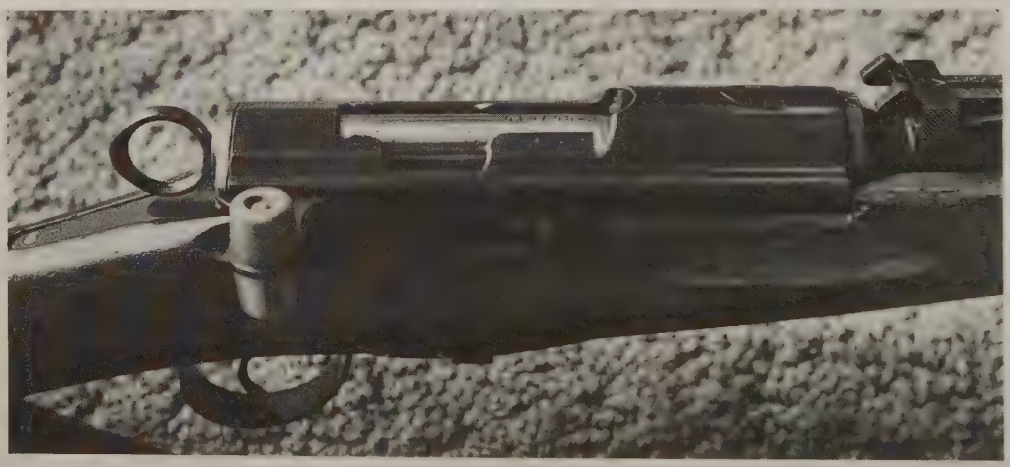
This was the last and no doubt best Swiss bolt-action service rifle. It has a shorter overall length because the locking lugs are at the front of the bolt rather than at the rear, as was the case on the earlier models, and the bolt itself is shorter. As with the M11 I tested earlier, I found this to be a very fast rifle to shoot. I frequently was able to extract an empty and load a fresh cartridge while the

empty was still in the air. With some extra effort, I got two empties in the air while firing the third shot! It is very smooth to shoot and probably the finest bolt-action rifle action that I tested in my research.

The rear ramp-style sight features a U shape that, unfortunately, is too narrow, whereas the front sight has a good blade design and is well protected by sturdy ears. The front sight also has interesting slot-cutting to allow for windage. I find that U-shaped rears are always difficult to keep centered, and my group of 2 3/4 inches at 100 yards was bigger than the rifle is undoubtedly capable of because of this feature. I found that hitting 10-inch metal plates at 300 yards was no problem from the kneeling position, nor was hitting similar-sized plates at 200 yards from the off-hand position.



The author fires his second shot with the Swiss K31 while the brass from his first shot is still in the air (over his head just slightly to the right and just above the tree line). Sometimes the author was able to get off a third shot while the first two cartridges were still in the air. You know that you have a very fast rifle when that is possible.



The right side view of the K31 shows the unusual Swiss safety ring, the stripper-clip guides, the detachable-magazine release button, and the bolt, which is covered with cold-weather knobs, as was the M11.

The trigger is quite good and surprisingly crisp for a military rifle, although it does have the typical military two-stage trigger.

The stock is the proper length for my 5-foot-9-inch frame, although I do find the pistol grip on the stock slightly large for total comfort. The rifle does not have a butt trap, nor does it have a cleaning rod slung under the barrel. What may appear to be a cleaning rod is actually a stacking rod. These deficiencies are unfortunate because such cleaning equipment can prove very useful in the field. I know it proved helpful in

The front sight on the K31 is much better designed than its U-shaped rear sight. Here you see the distinctive slot cutting that is designed to aid in windage.

Swiss militia members keep their rifles at home. Here a militiaman cleans his K31 while his wife carefully cleans his uniform.

Vietnam, and early M16 rifles that did not have it suffered from lack of maintenance as a consequence.

The felt recoil is quite heavy, which I find surprising because the M11 is so pleasant to shoot. Perhaps it is the shorter barrel on the K31 that makes the muzzle blast more noticeable. Certainly, the stock design seems the same, and the ammunition used in testing was identical.

These Swiss service bolt-action rifles are really very fine weapons. I think their general lack of appreciation is because of their limited numbers and the scarcity of ammunition to shoot in them. If you get a chance to shoot them as I have, you will soon discover they are the fastest, slickest bolt-action rifles around, as well as being excellent shooters. Any time you can get the second and sometimes the third shot off while the brass is still falling through the air, you know you have a very fast manual repeating rifle.

The main drawback to these weapons is their use of U-shaped rear sights. If they were fitted with a good peep sight, the ability to accurately place the bullets would go up quite a bit. I am certain that Swiss match shooters must have some type of peep sight available to fit the actions, but I have never seen one. It would be worth some effort to locate one, and, if unsuccessful, modifying something available in the United States would be worthwhile, given the high performance such a rifle is capable of delivering.

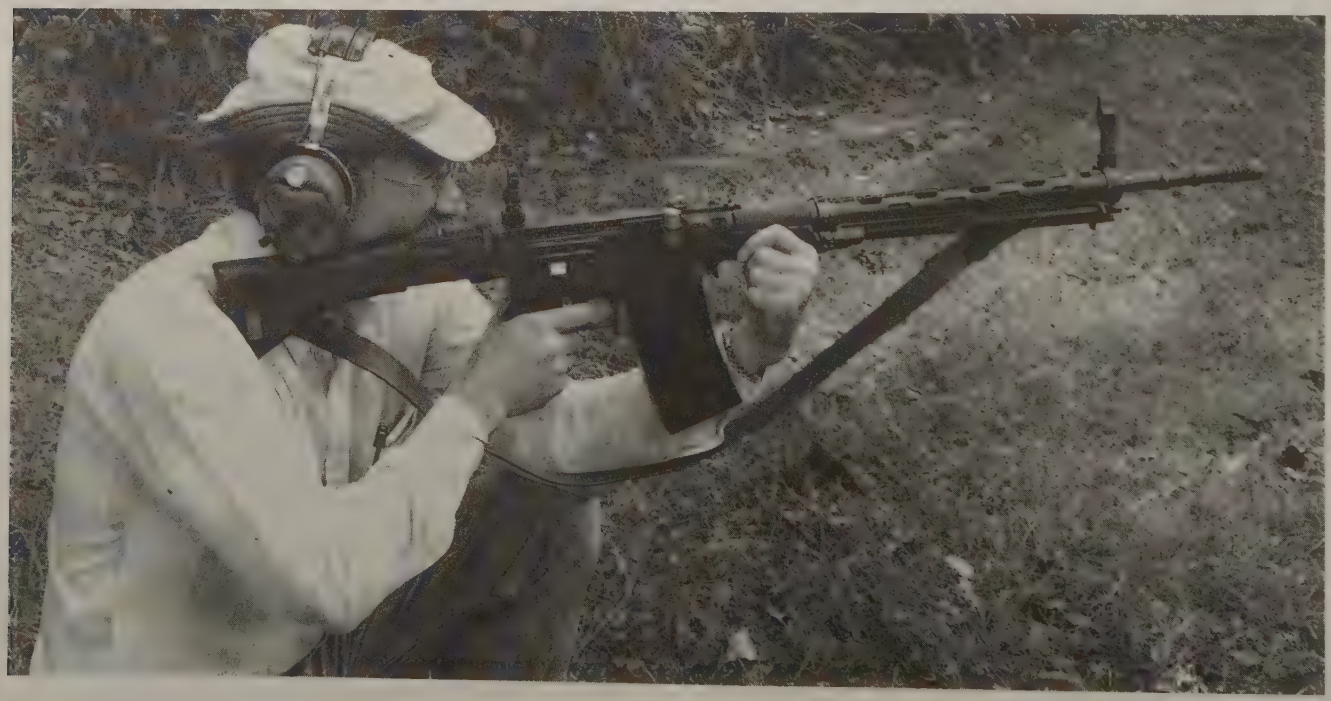
STG 57

During World War II Switzerland guarded its neutrality with the K31 straight-pull rifle. As just discussed, the K31 is indeed a very accurate, fast, and reliable rifle, but many Swiss military planners must have felt they were behind the times when they saw the near-universal adoption of the M1 Garand and M1 carbine by U.S. forces, the adoption of the M40 by the Soviets, the K43/G43 and MP43/44 by the Germans, and the MAS 44 by the French. Developing a new weapon and adopting it while remaining a neutral nation surrounded by the armies of the Third Reich was impossible, but as soon as the war was over, work began.

Whereas the Soviets went to the AK-47, modeled after the short-range, 7.92x33mm German cartridge, the Swiss—who have a tradition of 300-meter target shooting, as well as a terrain filled with many wide, long valleys—wanted something with better range (as did the United States, which forced the adoption of the 7.62x51mm round onto NATO). The Swiss were not part of NATO and already had huge stocks of 7.5mm ammunition. Their new rifle would shoot that cartridge.

The Swiss decision to adopt the 7.5mm cartridge meant that the rifle selected was going to be pushing the envelope of combat rifles. The resulting STG 57 is frankly more like a "machine rifle" than a standard infantry rifle. It is long and heavy at 13 1/2 pounds but extremely well made and reliable. Although packing the rifle about is difficult, the lack of humidity and heat in Switzerland makes this less of a problem than it would in many areas. Additionally, of course, training exercises generally are not as long or as rigorous as real combat.

Because of the demands of the Swiss shooters, the STG 57 has excellent, fully adjustable rear sights. The rear sight folds down on the top of the receiver when not in use. Although this makes it easier to carry the weapon, because it avoids snagging of the projecting sight, I fear that the sight may well be down when it is needed most. Also, because of the shape of the stock and the height of the sight, it is not very good for quick, instinctive firing. Of course, given the



The SIG STG 57 is more like a machine rifle than a standard infantry rifle, which was its original purpose. The rifle's heavy muzzle-forward weight makes firing from the kneeling position difficult.

The location of the safety on the left side only makes it very inconvenient for left-handed shooters to use, and it is slow even for right-handed shooters.

weight of the weapon and the design of the safety, quick-reaction shooting is not easy with the STG 57. I did not get a chance to try it on flying clay birds, as I attempt to do to evaluate quick-reaction attributes of weapons, but I doubt I would have been satisfied.

The safety level is located on the left side only, which makes it difficult to operate for left-handed shooters. But even for right-handed individuals, it is not a quick safety. The safety on the STG is very slow to use because of its location and the fact that its lever is very tightly fitted and long, and the whole thing lacks any real leverage to allow the thumb to flip it off rapidly. It is disappointing to have such a pistol-grip safety be so slow to use, but, actually, it is no slower than the safety system on an AK-47. However, it is substantially slower than the safety found on the M16, AR-18, L85A1, or similar more user-friendly designs. Removing the STG 57's safety requires the shooter's taking his right hand

off the grip and pushing the safety off or to use his left hand. Using the left hand is difficult to do unless the weapon is supported because the weapon's length and weight cause the weapon to drop down at the muzzle. If the weapon is supported by the bipod, the left-hand safety-removal method is acceptable.

The STG 57 has a heavy metal barrel jacket covering the barrel. Although it does keep the shooter's fingers off the weapon barrel, the barrel adds much more weight than it needs to. Such forward weight does help keep recoil under control, but it also means a lot of extra weight to pack around in the field and is no doubt a nightmare to keep clean in the field in the event of rain and mud. I would imagine that if the STG 57 was ever actually used in long-term, active combat, because of the difficulty in getting the mud and water removed, the barrels all would be pitted along the areas covered by the shroud.

Overall, the STG 57's primary drawback is that although it was designed as an infantry rifle, it is closer to a machine rifle. As a machine rifle, the weapon lacks a quick-change barrel, has a cyclic rate that is too high for proper effectiveness, and excessive weight that, given the cartridge fired, creates too much dispersion on full-auto at ranges greater than 300 meters to be truly effective—at least if evaluated with other true machine rifles such as the FN D model. Fired on quick semiautomatic, the STG 57 fares better, of course, and that really is how the STG 57 was meant to be used, except in rare situations. Furthermore, it is too slow for quick-reaction shooting because of its weight, overall length, sights, and safety system.

As an infantry rifle, it is not in the same class as its successor, the SIG 550 (STG 90), which I would rate as one of the finest infantry rifles currently made, but the STG 57 still is an interesting "shooter's" rifle because of its accuracy and superb Swiss machining.

STG 90 (SIG 550)

The Swiss army is composed of all the able-bodied men in the country, so it has always prided itself on its marksmanship. In 1957, the STG 57—a full-sized, selective-fire rifle that was much like a lightened BAR—came on line, and the army began issuing it. The STG 57 fired the 7.5 Swiss cartridge, which is the equivalent of the .30-06 and weighed 13 1/2 pounds. Thus, it was more powerful and heavier than the FAL, G3, and M14, which might be viewed as its NATO counterparts. Swiss soldiers labored with the STG 57 for 33 years, despite the adoption of the M16 rifle in the United States and general adoption of the 5.56x45mm round in NATO countries. The Swiss military did not wish to give up the 300-meter capability of the STG 57 for what it viewed as the 200-meter limit of the M16 rifle and cartridge.

Things changed with the development of the SS-109 ammunition. The new bullet was heavier and longer because it contained a steel

The STG 90 (SIG 550) meets all of the requirements of the Swiss military and, in all likelihood, is the finest rifle of its type in the world.

penetrator and a tracer element. Prior attempts to produce tracer ammunition in 5.56x45mm had not met with much success. With the new SS-109 ammunition, greater accuracy at longer ranges was possible, and penetration was as good as with standard .308 ball rounds out to 800 meters. Previously, the Swiss military had seen a need for a new smaller, lighter cartridge and experimented with 6mm loadings but ultimately decided that it would be better off with a standard NATO round than it would with a special Swiss round. Switzerland's real threat, military leaders apparently concluded, did not come from NATO countries but rather from farther east.

Having accepted the cartridge, the Swiss military planners next had to develop a weapon, although they no doubt tested all of the available 5.56mm systems. Keep in mind that the Swiss do not fight in deserts or jungles, so climactic conditions throughout the world are not a consideration. Also bear in mind that the rifle issued to a new Swiss recruit will be taken home by him, kept for his entire service life (35 years or more), and it will be shot a lot. The Swiss know too what a real rifle should have, and they know quality when they see it. After extensive testing, the Swiss military adopted the SIG 550, also known as the STG 90. It meets all of the requirements of the Swiss military and, in all likelihood, is the finest rifle of its type in the world.

The STG 90 has a standard blade front sight that is well protected from blows and is capable of use with a radioactive element to glow in the dark by merely flipping it up. The rugged rear sight is a peep unit that can be adjusted for shooting out to 400 meters.

The bolt handle on the STG 90 is on the right side, which does limit its use by left-handed individuals. It has a rubber seal through which the bolt handle passes, thus keeping dirt and debris from entering the weapon.

The safety and selector are a combined unit. The lever is handy and long enough to allow it to be rapidly flipped off without shifting the weapon in the hand.

The pistol grip feels pleasant in the hand. The trigger guard swings to the side to allow shooting with mittened hands, something important in Switzerland's winter.

The magazine release is centrally located, which is convenient for use with either hand. Magazines come with 20- or 30-round capacity and are made of transparent plastic so the shooter can easily see how many rounds remain. Additionally, they are rugged, self-lubricating, and designed to clip together to allow the shooter to carry two or more on the weapon at the same time for a speedier reload.

The STG 90 has a folding stock that is much more pleasant to use than the standard metal folders. It is as rigid as a wood stock when fixed, yet folds and unfolds easily by merely pushing a button. In contrast to the Galil, the FN-FAL, and CAL or AK-47, you can swing the stock open with one hand with very little effort.

The stock has a nice rubber buttplate to keep the weapon in position and a two-sling swivel position, one for the traditional carry and one to permit the weapon to be carried over the shoulder.

The pistol grip contains a hollow, which is comfortable to the hand and convenient for storing cleaning equipment. The safety/selector can be easily flipped with either hand because of its length and precise fitting.

Trigger pull is almost up to bolt-action standard, yet I encountered no doubling with the test rifle, as often happens with semiauto rifles when the trigger is good. The upper receiver is held to the lower by captive pins, so pushing them out allows the weapons to be quickly disassembled. Such easy access tends to ensure a more complete cleaning.

The forearm is plastic but has a heat shield installed in it. Despite firing eight magazines quickly, the STG 90 never got as hot as an M16 rifle does with fewer rounds through it. The forearm is quite comfortable to hold, unlike the forearms on M16A1 rifles.

The STG 90 is equipped with a flash hider that appears to function satisfactorily. The

This right-side view shows the safety selector and the centrally located magazine release. The magazine is clear so the shooter can how much ammunition he has. The cocking handle is angled upward to allow easy cocking with the left hand. The rubber on the action blocks dusts and foreign matter from entering the weapon, yet the handle still slips through easily.

rifle will also fire rifle grenades (which apparently are still popular in Switzerland), I suppose, because of the lack of a 40mm grenade launcher.

The rifle is finished in a gray-green paint, which I believe blends in better in a variety of backgrounds than a totally black M16 rifle. Although at about 8 1/2 pounds it is not as light as the early M16, the STG 90 is lighter than the British SA80 and is obviously a vast improvement over the STG 57's 13 l/2 pounds.

The STG 90 has an adjustable gas system, uncommon on 5.56x45mm rifles. If your shooters are trained well enough to take advantage of it, it is always a plus to have such a system.

The STG 90 has a selective-fire capability, but as with any such rifle, it really should be used in semiautomatic mode unless a true close-range emergency arises. Given the weapon's stock design, weight, and excellent trigger, it is no trick to hit a chest-sized plate 15 times out of 20 at 200 yards in 15 seconds. Stay with semiauto on all such rifles.

Of course, the key to any rifle is its shooting. With proper match ammo, I was able to shoot a 3/4-inch group at 100 yards from the prone, using the integral bipod the rifle comes with and an open sight. Frankly, with my eyes and skills, I consider anything under 2 inches to be great. The light recoil of the weapon, excellent trigger pull, and good sights all allowed me to do that and repeat it out to 500 yards.

My favorite 5.56x45mm rifle is the AR-15A2 equipped with an M203 grenade launcher because it is accurate; its trigger is consistent if not great (because it does not have the three-shot burst limiter); its sights are adjustable; and the M203 gives it additional punch. However, the STG 90 would be my favorite 5.56x45mm if I were not concerned with replacement parts or magazines and did not have access to an M203.

Thailand

ENFIELD NO. 1 MK III "POLICE MODEL"

This apparently rare variation of the No. 1 MK III rifle was made in the post-1918 era by the Birmingham Small Arms (BSA) factory for commercial sale to the government of Thailand to arm its police. I have never seen it mentioned in any of my Enfield reference books, but I have shot it.

Basically, it is a standard rifle with the barrel shortened to 21 inches. As such, it has a slightly greater blast than standard models, but nothing that is terribly noticeable. It is also marginally lighter because it has less metal and wood, but again any increase in felt recoil is not enough to concern you.

As do its military counterparts, the Enfield No. 1 MK III police rifle has a well-protected square blade front sight coupled with a narrow, shallow U-shaped rear adjustable sight for windage and graduated from 200 to 2,000 yards. Because it is a police rifle, I think it is very unlikely that it ever would be used at such extended ranges, and I assume that BSA merely installed available sights because it obviously would not adjust properly given the shorter sight radius from the standard military rifle.

As is standard for this series of rifles, the Thai Police Model lacks a cleaning rod under the barrel, but it does have a butt trap to hold cleaning supplies. The trigger is standard,

The Enfield No. 1 MK III Thai Police Model is a rare variation of the No. 1 MK III rifle. It was made by the Birmingham Small Arms factory for commercial sale to the government of Thailand to arm its police.

with a two-stage mechanism and a weight on the last pull of at least 6 pounds. It also has some creep and would never be mistaken for a match trigger.

The rifle is heavy for its length, but I found it quite handy to use in close situations, such as around buildings or cars. Although muzzle heavy for off-hand and kneeling shooting, it was not as bad as the standard model. However, trimming it another 5 inches would make it even better, although that would substantially increase blast.

The biggest drawback to this weapon, as is the case with any Enfield No. 1 pattern rifle, is its poor sights. They are hard to see, and it is difficult to maintain proper elevation and windage. I fitted an A.J. Parker Company peep sight to my own No. 1 MK III rifle and found that my ability to shoot the weapon went up dramatically. Before doing this, I found it difficult to get constant hits at 300 yards on 10-inch plates; however, with the peep unit, I was able to get good results at 600 yards. I would have liked to add my A.J. Parker peep sights to this Thai Police Model to see how it would work. I am sure it would have improved my performance.

As a police rifle to be used by rural-based officers, the Thai Police Model is a very interesting weapon. I think a little better thinking could have been applied—the barrel could have been shortened to no more than 18 inches and a peep sight fitted so that the rifle could be used more quickly and effectively. I must say, however, that I prefer this Thai modification to a standard No. 1 MK III because of its increased handiness with little if any loss of efficiency. It is a good idea and is more the pity that the British did not adopt it generally.

HECKLER & KOCH 33/93—5.56X45MM

This rifle was H&K's original attempt to compete with the Colt M16 series. H&K took its very successful G3 rifle chambered in 7.62x51 NATO and scaled it down to fit and fire the 5.56x45mm round. As with many such designs, it was not totally successful. The resulting rifle did eliminate the gas operation that created problems for the M16A1 rifle when cartridges were loaded with ball powder that had a tendency to foul more, and it is more reliable. However, the H&K 33/93 series weighs more than the M16A1 rifle. Additionally, its having come on the scene late means that it was not adopted by any major army: the German army decided to skip over 5.56mm to the caseless cartridge, but when reunification occurred, it scrapped that idea because of high costs and lowered demand

The H&K M93 rifle is identical to the standard H&K M33 except for the selector lever and the additional centrally mounted magazine release.

and an immense surplus of AK-47/74 rifles contributed by the Eastern part of their new unified army. In fact, to the best of my knowledge, only the Thai army adopted the H&K 33 rifle, except for small test lots and police use.

When testing the H&K 33/93, you are first struck by the typically poor H&K-style sights, which make good shooting difficult. The trigger pull is also very heavy, stiff, and gritty. The safety is difficult to disengage without breaking your grip, unlike the M16 safety, and impossible to reapply without breaking your grip unless you have exceptionally long thumbs. The safety is not ambidextrous, and the trigger guard does not fold down or to the side to make winter use easier. I understand that might not be an issue in Thailand, but for a rifle developed in Germany, this lack strikes me as quite odd.

The magazine release on the semiautomatic version H&K 93 is a push-button that is best used by right-handed shooters, but the H&K 33 selective-fire version offers a button plus a centrally mounted flipper, which is quicker to use.

The H&K 33/93, as with all H&K products, lacks a hold-open device for alerting the shooter to the fact that the last round has been fired. This is a matter of taste, but I prefer to have the weapon lock open when the last round is fired to allow reloading more rapidly and getting the weapon back into action. Loading the last few rounds with tracer to alert the shooter to the end of the magazine is only a marginal solution in 7.62x51mm weapons and hardly works with 5.56x45mm rifles because the tracers in the smaller caliber are much less effective. I frequently find it difficult to even see 5.56mm tracer rounds in daylight. I cannot see what benefit is obtained by deleting the hold-open device that would make up for all the potential trouble created by its absence.

The amount of pressure it takes to pull the bolt to the rear to cock the rifle always surprises me. For a small person, it may be nearly impossible to cock the weapon while lying prone without exposing himself to enemy fire. This could pose some real problems in many situations.

The rifle tested had the so-called "tropical forearm," which is larger and does not heat up as quickly as do slimmer ones, thus allowing the shooter to hold the weapon longer. The drawback to the tropical forearm is that it is broader on the bottom and hence much more difficult for the shooter to grasp firmly. Attaching a bipod exacerbates the problem, as was the case with the test. The

The author fires the H&K M93 off the bipod.

The sliding buttstock makes for a compact unit, but the metal struts are hard on the cheekbone when firing on full auto with either 5.56x45mm or 7.62x51mm weapons because of the recoil. The safety on the H&K 33 is like that found on the G3: it is too short to allow the shooter to flip it off without shifting his hand.

bipod also rattles and is noisy when extended, although, fortunately, it is not a problem when folded up along the forearm. The bipod can be deployed quickly by merely pushing the legs out, and it is sturdy when extended. However, the rifle cannot be used with the 40-round magazine when the bipod is extended and in use because that causes the magazine to strike the ground. That is rather odd when you consider that the weapon would be most effective in the full-auto mode in the prone bipod position, and in that situation, the larger 40-round magazine capacity would be more practical.

The flash hider seems to be effective, but as with many such units designed before the adoption of the M16A2 rifle, it is open at the bottom, top, and on both sides. As a consequence, the gas deflected downward will cut open sandbags and kick up dust and sand, giving away your position if enough firing is undertaken.

All H&K rifles are inherently accurate, but the design makes it difficult to capitalize on that accuracy because they are certainly not user-friendly rifles. The test rifle was able to shoot groups of 1 1/2 inches or less at 100 yards, which I think is quite acceptable, but with better sights and a trigger pull, I think better results could be achieved. The H&K 33 should not be used in full-auto mode because of control problems that result from the design of its stock, its high cyclic rate, and its heavy felt recoil produced by the roller lock design. Of course, I do not believe that any shoulder-fired weapon is really as effective on full-auto as with fast semiautomatic fire.

Although I like the H&K 53 version of the H&K 33 because it offers a short-barreled 5.56mm rifle without the worry about low gas pressure and functioning problems encountered with gas-operated, short-barreled weapons—such as the XM177E1/2 (CAR-15)—I do not care much for the H&K 33. There are a lot of 5.56mm rifles available today, and quite a few are superior to the H&K 33/93 weapons.

Turkey

TURKISH M1903 MAUSER

Turkey used a wide variety of Mauser rifles because Turkish procurement officials were very smart when it came to buying weapons. They realized that small-arms designs changed continually as better weapons were developed. They also had a large army to equip. They went to Mauser and contracted for rifles of the latest pattern, but they added a clause in the contract that required the Mauser factory to give them the latest patterns when they came out to complete any unfulfilled contract. Thus, the Turks contracted for M1888-style rifles, but when the later models came out they got them instead. This continued until the latest approved pattern or the M98 came out, which was so close to perfect that except for fittings, nothing was changed thereafter.

Weapons from Turkey are generally in poor condition when encountered. Conditions are always harsh, the supplies to maintain them were minimal, and the time the weapons spent in service was long. Rifles were modified from time to time to both keep government arsenals busy and meet perceived needs. Thus, there are lots of different Mauser-action rifles around, but I selected the M1903 as perhaps the most typical rifle that would have been used in World War I when the Turk was found to be a wily and determined foe. It is chambered for the 8x57mm cartridge, no doubt aiding the resupply situation because ammunitions, rifles, and advisors all came from their German allies.

The M1903 has a typical M98-action-type safety and trigger system. The safety is slow to disengage or engage. Although I prefer to ignore it and use the bolt to get the safety, I seek leaving it partially open.

Trigger pull is typical two-stage Mauser, and on the test example it seemed to be about 7 to 8 pounds. That is not perfect by any means, but on a rifle more than 80 years old that has fought at least one war and has likely been carried by men who had limited appreciation of mechanical things and shooting in particular, it is adequate.

The front sight is an unprotected pyramid type, coupled with a V-notch rear sight. Interestingly enough, the range markings are in Arabic script numerals on top of the slide, whereas Roman numerals are on the side. (The Arabic script was used in the pre-World War I Turkish Empire, through the war, and even up to a few years after the founding of the Turkish republic in 1922.) The V-notch rear sights, which are shallow, are very difficult to use, and elevation or windage is hard to maintain. It is no different with the M1903 Turkish Mauser example.

The rifle has no butt trap but does have a cleaning rod slung under the barrel. I would imagine many a Turkish sergeant had to really watch his troops to make certain the rifles were properly cleaned after being fired. One

The author shoots the Turkish Mauser M1903 off-hand at 200 yards.

The Arabic script indicates that this rifle was made for Turkey at the factory and not purchased on the world market.

shudders to think what the consequences were in the pre-1918 Turkish army for failing to clean the rifles properly. I would imagine they were rather severe.

Like its pre-1920 German counterpart, the Turkish M1903 has no hold-open device or magazine cutoff. I imagine that the lack of the first feature proved fatal to many a Turkish soldier, whereas the second would not have been missed—but its absence is surprising because many pre-1914 military thinkers still thought they were good ideas.

The rifle is long and quite heavy, especially in the muzzle area. This muzzle heaviness makes the rifle difficult to shoot off-hand; it becomes very tiring to hold the weapon out from the shoulder.

The M1903 is not an infantryman's dream by any means: it is long, ill balanced, equipped with poor sights, and slow to operate because its action is very stiff. Certainly, the Turks must have looked with longing glances at any Enfield No. 1 MK III rifles they happened to come across as captured weapons. Although their sights might not have been much better, the Enfields were shorter, held twice as much ammunition, had a better safety, and were generally much handier.

Despite the drawbacks of his country's weapons, poor supply network, corrupt political system, and brutal treatment, the Turkish soldier proved to be very formidable. Of course, the critical element is always the men, not the equipment, but just think what such troops could do if well led, well equipped, well supplied, and treated like men of honor rather than animals!

Union of Soviet Socialist Republics

MOSIN-NAGANT M91 RIFLE

This is a very old rifle design, but it is still found in the hands of guerrillas around the world and, at least in carbine format, was used commonly in Vietnam. After all the other rifles from this period have disappeared from the scene, the M91 Mosin-Nagant soldiers on.

The model I tested was a Finnish model dated 1941, and I must say that it shot well: a three-shot group of 1 1/4 inches at 100 yards from a rest, shooting Russian ammunition. I commonly shoot short-barrel weapons in .308 caliber, so I found the long 31 1/2-inch barrel very quiet, and the typical blast effect I am familiar with was missing. The recoil was also quite light, which is remarkable for a weapon that fires a cartridge equal to the U.S. .30-06.

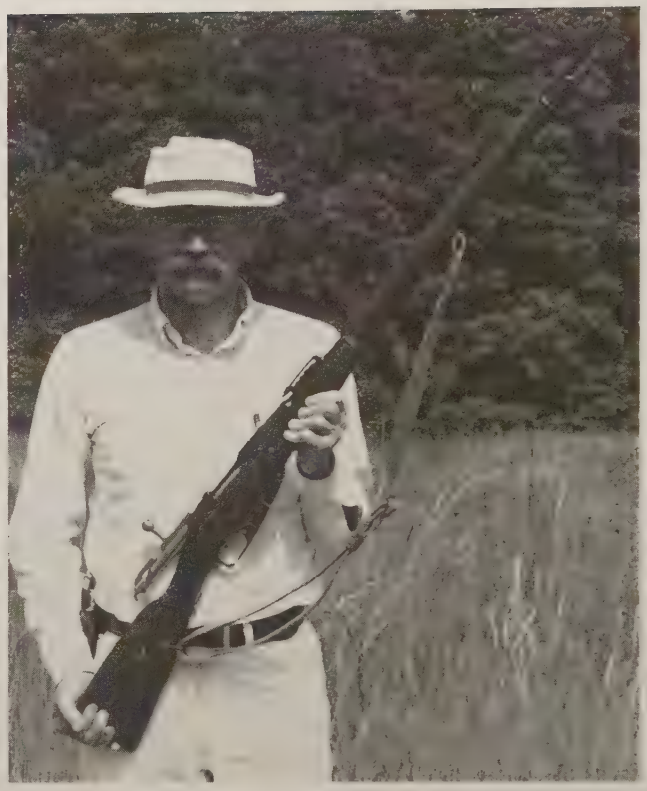
Although the barrel is quite long, the weapon balances well, and in the off-hand position, I did not encounter the muzzle heaviness that I would have expected. I believe that is attributable to the lightweight barrel. This same barrel, however, got quite hot—after firing 20 rounds quickly the upper

World War I Russian soldiers use the Mosin-Nagant rifles.

forearm was so hot that I could not hold it without burning my hand. Because that is exactly the area where I would grab when thrusting with a bayonet, I wonder how Russian soldiers were able to use their bayonets effectively. Perhaps the Russian winters are enough to keep the problem to a minimum, although the day I tested the weapon, it was in the mid-70s.

Sights on the M91 are the typical European V-notch rear coupled with a pyramid-shaped front. The slope on the angle on the front sight, however, is sharper than on many European rifles, giving it a more vertical blade effect that I actually find easier to use. Sights are calibrated for what today we view as unnecessary, going up to 3,200. I assume that to be metric, but perhaps it was the old Russian pace, which was less than a meter. Anyway, it was a long way. Just to see how it would work at that distance, I placed the sights on 3,200 and attempted to sight the weapon. I could not hold it at my shoulder and use the sights because of the steep angle necessary; I had to tuck the stock under my arm. In 1891 when the rifle was adopted, the rifle was used instead of mortars and machine guns, but why the Russians continued to use these sights after 1918 is a mystery to me. I guess they do no harm, although I have seen people in what was Yugoslavia with the sights on their AK-47s set at 800 meters. Because the target was only about 100 meters away, I asked why the shooters had their sights set so far. They responded that it was because doing so made the weapon more powerful—because that setting allowed the bullets to go farther, they reasoned that it must make the weapon more powerful. How many soldiers survived World War II because so many people were so ill educated about weapons?

The trigger on the weapon has the typical two-stage military pull, but it also is so heavy that you cannot tell when it goes off. This does help control anticipation of recoil, but it makes it difficult to shoot fast and accurately from both kneeling and off-hand positions. Even though, if you take your time, it does no harm, a crisper pull would be better. The whole bolt seems to lift when the trigger is pulled, which also makes it heavier than it needs to be.



The Mosin-Nagant M91 rifle is a very old rifle that is still used by guerrillas in all parts of the world. It shoots well, but it suffers from a serious drawback: the design of the bolt makes fast reloading practically impossible.

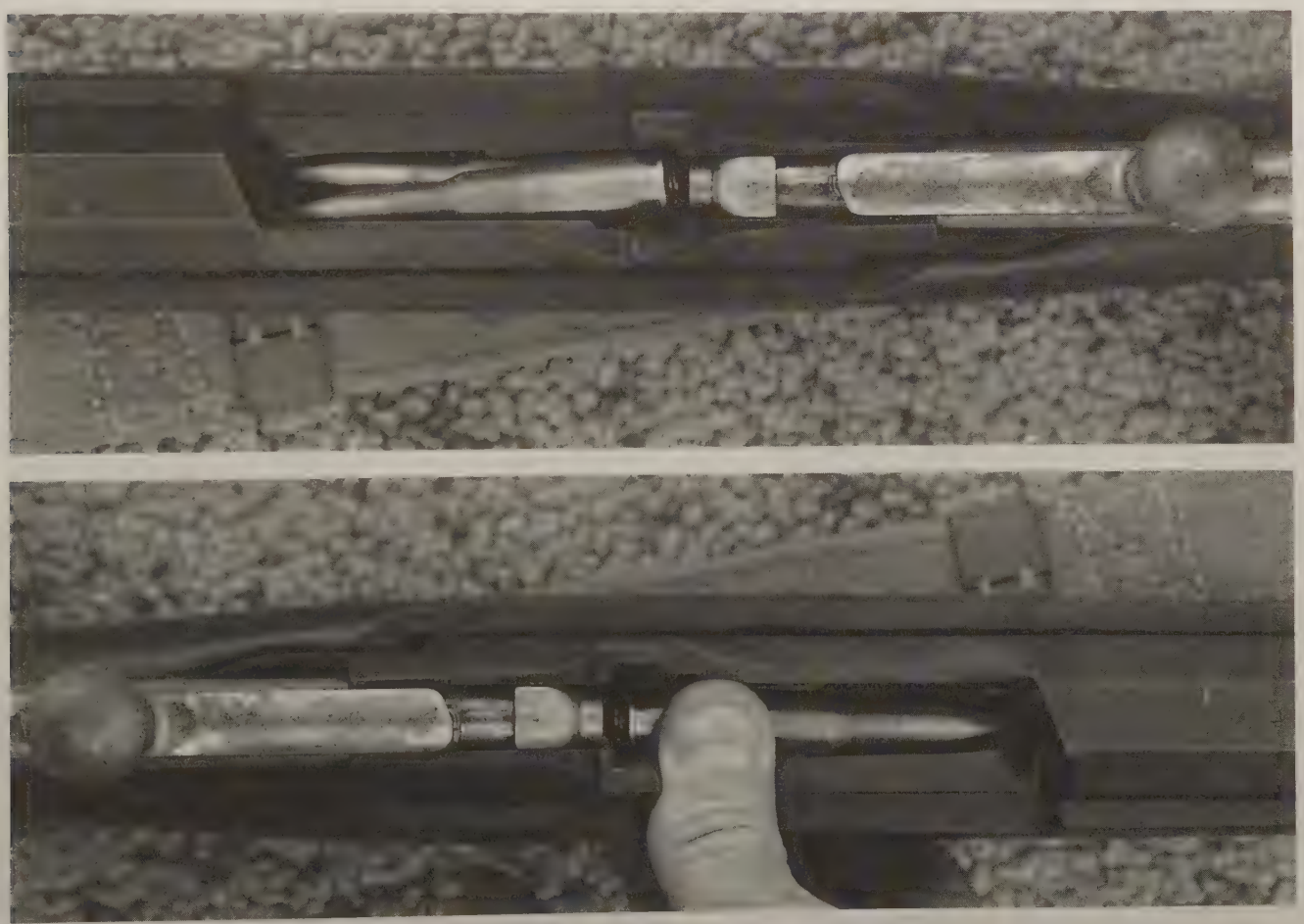
The safety is applied by pulling the end of the bolt by the round disc of metal to the rear and left, which would be a difficult task with cold-stiffened hands and mittens. Worse, however, is the fact that it is difficult to take the safety off. You must pull it back again and twist it to the right. Compared to the various Enfields and the Japanese service rifles, this is a very slow release. You definitely would not be able to merely slip it off and fire a quick shot at a rapidly disappearing target in the jungle or woods. Most soldiers probably just ignored it and left the bolt handle open slightly as a safety device and closed it rapidly as they mounted the weapon. That is what I

would do, anyway, much as I do with M948 Mauser rifles.

The rifle includes a cleaning rod under the barrel, which is a nice touch, but the butt plate was solid. Inserting a trap in it to hold cleaning brushes and solvents would have been a good idea since the space was available.

Sling swivels on the M91 seem to come in different formats. Early rifles have no swivels, but rather slots cut through the stock. The sling then is fitted on. I rather like that because it will not rattle as metal slings do, so you don't have to tape the swivels down for patrolling purposes. Obviously, mine is a minority opinion, because the later models have the slots, but they also have the swivels through the slots like the example tested. The sling with this rifle seemed to be only a carrying strap, so the Russians must not have anticipated using the sling to aid shooting. They thereby lost a significant opportunity to improve their shooting, because a properly used sling can enhance accuracy by as much as 40 percent—and that improvement is obtained with very little weight gain. Even though most people do not use slings any more as a way to improve accuracy, I became a convert many years ago when I was doing a lot of 450-yard kneeling shooting. I was impressed at the better results I could get with a sling, and targets at that distance give you enough time to get into a sling.

The worst thing about the M91 is the action. Empty the action works quite well, although it is not as handy as a bolt-action rifle on which the bolt handle is located farther back. But when the rifle is loaded and fired, a different animal is revealed. The



Rimmed cartridges must be pressed down through the clip guide a the rear of the action to avoid malfunctions.

action simply cannot be worked with the stock at my shoulder the way a bolt action is operated if you are going to get up any speed. I cannot get enough leverage to flip it open without removing the rifle from my shoulder and shoulder and dropping the rifle down a bit to improve my leverage. Once open, it slides back easily, and the empty case falls out, establishing normal pressure for the ammunition, and it can be pushed forward and closed easily. On a normal bolt gun, I simply flip up the bolt with a finger or at worst grab the bolt handle in my palm and crank it up, but neither of these methods works with the M91 Mosin-Nagant. When I tried it, my hand would slip off, the stock would slide off my shoulder, and the top of the stock comb would hit me in the side of the neck. Naturally, having to remove the rifle from the shoulder slows repeat shots. So many people have gotten more than 25 rounds per minute with a Lee Enfield that it is hardly noteworthy when people do it, but nobody could get anywhere near that rate with an M91 Mosin-Nagant. Additionally, the rifle's light weight and lack of an upper forearm around the very beginning of the barrel area where it hits the receiver caused my left hand to slip and my thumb to touch the barrel, burning it each time—which is also not very conducive to fast repeat shots.

The M19 Mosin-Nagant uses the 7.62x54R cartridge, and because it is rimmed, you must make certain when you load it that the rims are placed in the magazine properly. When you use a stripper clip, it is not a problem because the clip fits into the cuts in the receiver, making alignment easy and certain. Loading with loose rounds is more troublesome, and care must be taken to place the rims of the rounds in the same cutouts to avoid jams. If properly stacked, however, functioning is perfect.

After using the M91 Mosin-Nagant for the better part of a day, I was impressed with its accuracy potential, yet appalled at its lack of reloading speed. Although faster than an M1873 Springfield Trapdoor rifle, it is not nearly as fast as its German contemporary. Not being able to work the action rapidly with the rifle shouldered is such a drawback that I am surprised that something else was not adopted immediately after better weapons became available. Perhaps it was force of circumstances that caused the Russians to continue to use the M91 so long after these obvious defects were known.

MOSIN-NAGANT M91/30 SNIPER RIFLE

The rifle tested was manufactured in the Soviet Union during World War II. The scope on it was made in 1967 but was similar to the one used in World War II. The test example had been captured unfired in Cambodia and brought home. Although a well-traveled piece, it was in excellent condition and still had the grease in it left by its North Vietnamese owners.

The M91/30 sniper rifle really is similar to the standard rifle except for the bolt handle, which is bent down, and the addition of the scope. I do not believe that the Russians selected exceptionally accurate rifles through testing and then designated them for use as sniper rifles. In my shooting test, I found that my standard M91/30 rifle with iron sights shot a smaller group than that fired with this sniper's unit. Trigger pulls are the same, so obviously they are not specifically fitted out. Loading the sniper version is difficult and slow because the scope blocks access to the stripper clips, making them unusable. Instead, you must load the rounds one at a time. Because the rifle uses a rimmed cartridge, you must put the rims in the notch provided, or they will not feed properly, which is a slow process. Doing it on the move would be difficult and problematic: not only would doing it on the move slow you down even more, it would also likely cause you to strike vegetation or other obstacles with your rifle, thereby giving away your position to the enemy.

The bolt handle is bent down, and this slows reloading. The handle is so close to the

The bolt handle on the M91 sniper rifle is turned down rather than straight out, which significantly slows down its operation.

The author tests the Mosin-Nagant M91/30 sniper rifle from the sitting position at 300 yards.

stock that I found I could not merely put my palm under it, strike upward to bring it up, and then shift my palm to strike it and bring it backward, as it should be if speed is the primary objective. Instead, I had to grab it with my fingers to bring it up first—always is a slower process because it substitutes fine motor skills for gross motor skills.

Not only did the scope preclude loading the weapon with stripper clips, it also made it nearly impossible to apply the safety. Although the safety on the Mosin-Nagant M91 rifle is nothing to cheer about, at least it can be applied. With the sniper version, however, the space between the rear of the bolt and the scope was such that, coupled with spring tension on the bolt, it was almost impossible to apply the safety. Clearly, this is a rifle on which to leave the bolt handle slightly up for safety.

Loaded, the rifle weighs almost 12 pounds. Further, it has a long barrel, so

A Soviet soldier in World War II equipped with the M91/30 sniper rifle.

recoil is light and muzzle blast low, as might be expected. I did not get a chance to shoot it at night, but muzzle flash would no doubt be minimal, always a good point on a sniper rifle. Firing the rifle in the off-hand position, however, is difficult because of the rifle's weight and length, and the sitting and kneeling positions were not much better. Prone or supported shooting must be the normal way this rifle is fired in the field.

The telescopic sight is of lower power (2.8X) and has a small field of view. The mount looks rugged enough, and the scope likewise seems sturdy. However, both are heavy. The scope does not seem to offer much light-gathering capability, although it is better in that respect than the scope used on the British sniping rifle, the No. 32. The reticle is a large, pointed black post. On each side is a similarly thick post that is square tipped. Given the small field of view, the thick post would obscure much of the target, but I imagine you could pick up the reticle in poor light quickly, whereas thin cross hairs frequently are impossible to see in the dark. Interestingly enough, the reticle moved as you adjusted it. It has been a long while since I had used a scope on which the reticle moved during adjustment, and I was reminded of the Tasco scope I had mounted on my Enfield M1917 Sporter in 1959. By the time I got finished sighting in the Tasco, the cross hairs were in the top third of the scope field. This was very unsatisfactory then and is no less so on an M91/30 sniper rifle.

The scope has adjustment for bullet impact from 100 to 1,200 meters, but given the accuracy I was getting, I think I would be looking for big targets at the 1,200-yard mark. Interestingly enough, the iron sights on the M91 go far beyond 1,200 meters, thereby telling me that somebody is tradition bound and not thinking too clearly. In fact, after my tests, I would say that I think this is more of a

500-meter sniper rifle than a 1,200-meter rifle. Of course, during the war, the Russians fielded a large number of snipers who ran up very impressive totals on German troops. However, I would imagine most of them were shot at considerably less than 500 meters.

Even though the M91/30 sniper rifle falls far below what we in the United States expect from our sniper rifles, for such rough close work, a large number of these rifles, which could be made at very little expense, no doubt proved a worthwhile addition to the Russian infantry unit facing the German onslaught.

WINCHESTER M95 RUSSIAN MUSKET—7.62XMM54R

When czarist Russia entered World War I in 1914, its army was huge but poorly equipped. Although it had been among the first European nations to adopt a small-bore (30) smokeless rifle (the M91) and also manufactured it in country, soon the combination of heavy losses and a ballooning army meant that the czar had to look for new supply sources. Obviously, any weapons made in the United States, the best developed and most convenient neutral (at the time) country, would take a long time to arrive because manufacturing facilities there would have to be set up to make them. What Russia needed in early 1915 was a battle rifle that could be obtained at once while the U.S. factories tooled up to make the standard M91 service rifle. Russian supply officers were able to accomplish this by adopting the musket version of the M95 Winchester lever-action rifle. Obviously, chambering it for 7.62x54R was easy because it already used such rimmed cartridges.

Soon Winchester was turning out a large quantity of the M95 musket for that cartridge. In fact, there were more rifles made in the United States in that variation than in any other style. The standard M95 lacked some of the things necessary to make it a military rifle, but they were soon added: long-range sights, an end cap that allowed a bayonet to be mounted, an upper handguard to protect the hand, and a stripper-clip guide to permit the soldier to load his rapidly. The design of the M95 rifle had always been considered rugged, but service in a Russian peasant army with few facilities to maintain it in the field, during which the rifle would be exposed in one year to more stress than that produced by a

Soon after entering World War I, the Russian military realized that it needed a fast, ready source of rifles to supplement its supply of M91s. There was no time to tool up for a new design, so it decided to adopt the musket version of the M95 Winchester lever-action rifle.

hundred hunting seasons, would prove the ultimate test for the musket. Maintaining the M95 in the field must have been very difficult because it does not detail-strip easily and will get very wet when you clean the bore with hot water after shooting corrosive ammunition through it. Most M95s apparently led quite a hard life, so finding one that is in good enough condition to test and evaluate fairly got to be quite a problem. Fortunately, Noel Schott came to the rescue and provided an example from his collection that if not in mint condition was certainly in excellent shape, based on National Rifle Association guidelines.

The first thing you notice about the Russian M95 is how long and muzzle heavy it is, compared to a standard M95 rifle, much less the carbine. But soon you also begin to notice other design flaws. It lacks the lively feel that the U.S. version typically encountered has. The front sight, although its color and shape allowed fair pickup, is quite thin and hard to see. The rear sight is a long military pattern calibrated to well in excess of anything anyone is ever likely to use. The lowest setting is 400 meters, which means, of course, that at any reasonable, realistic combat range, aiming at your target is likely to result in a high spot. Aiming at the head at a trench 80 yards away is almost guaranteed to ensure a miss with such sights.

The weapon has an upper handguard that, although it does not cover the entire barrel, does cover enough to prevent your burning a hand when using the bayonet. However, the handguard also left a lot of barren blued metal in the open to rust and reflect light, which is undesirable. As with many M95s I have seen, the receiver on the Russian rifle has no bluing left and would have shone in the field. I suppose the rifle could have been painted to dull it, but I have never seen any rifle done that way.

The stripper-clip guide is a clever addition, and anyone who has ever fed spare rounds into an M95 will appreciate it. Of course, you cannot load the rifle without opening the action, unlike on an Enfield, but I suppose that is no worse than on a Mauser or M91 Mosin-Nagant in that regard. The action works smoothly, and the trigger pull is quite good. The trigger guard is small for mittened hands—it escapes me why Winchester did not make it bigger because it would have been useful for northern hunters as well.

The M95 lacks any safety except a half-cocked notch, and the visible hammer is supposed to alert the soldier to his weapon's readiness. Many Russian soldiers must have had numerous accidental discharges over the years because of this lack of safety.

The buttplate has a metal plate with a hole for cleaning equipment, which is always a nice feature. The sling swivels rattle and needs to be taped down, and, having only a carrying strap, the rifle lacks a proper shooting sling.

Shooting the rifle is challenging because of the poor front sight and the small rear notch. Recoil and blast, however, are low, and second shots could be fired quickly because of the rifle's low recoil and smooth action.

As a substitute standard, I suppose the M95 Winchester musket was not a terrible choice for the Russians. However, I cannot help but think that they would have been better off to either buy M97 12-gauge shotguns to equip their combat troops and thereby spread out the remaining M91 rifles or buy carbine versions of the M95 in 7.62x54R so that the troops would have a more lively rifle to use. Trying to make the M95 into a traditional military-style rifle yielded an interesting variation for me to test and evaluate but a poor weapon for the Russian soldier who was issued it.

TOKAREV 7.62x54R M40

The rifle tested is an improvement over the earlier M38. Despite becoming available in 1940 (the test gun was dated 1941), these rifles never displaced the bolt-action M91/30 Mosin-Nagant in the Soviet armies because of a number of problems that never seemed to get fixed. First, of course, is that they used a

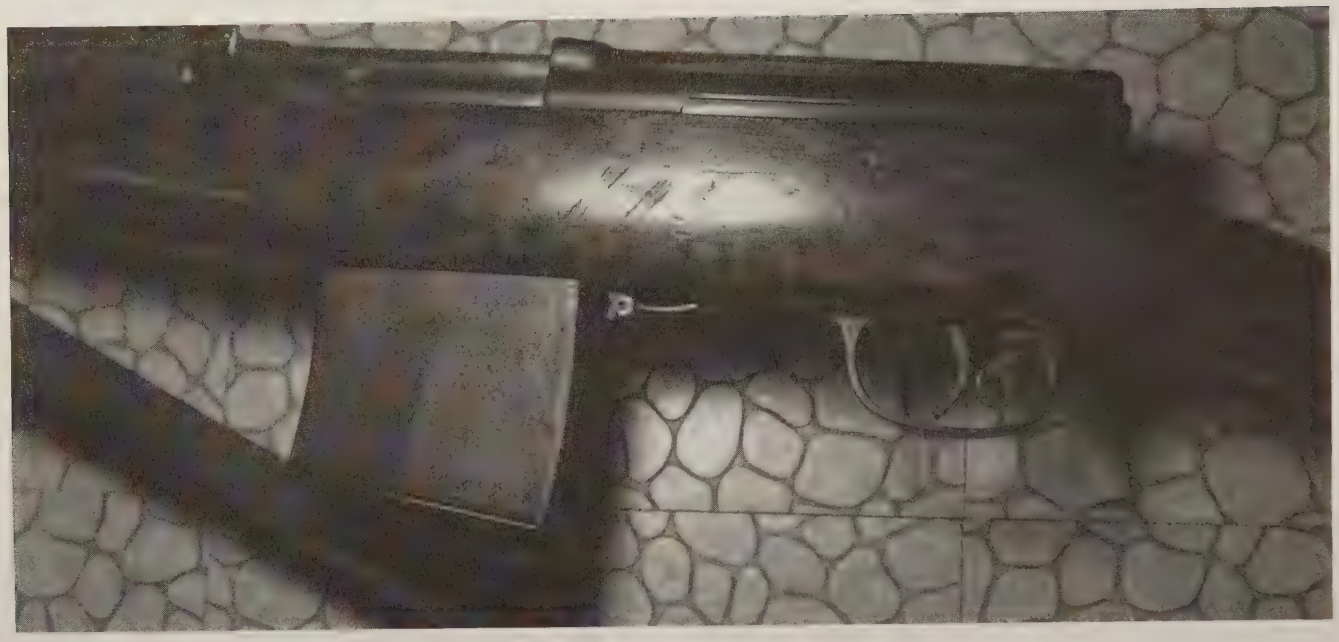
A Russian soldier in World War II armed with the M40 Tokarev sniper rifle.

The Tokarev 7.62x54R is an improvement over the earlier M38, but this rifle had a lot of design flaws that made it ineffective as a battle rifle.

rimmed cartridge. Such cartridges are not the most reliable for box-magazine-fed autoloading weapons, although they can be developed, as witnessed by the Bren LMG in .303 British caliber. Second, the firing pins tend to break because of a large cut in the rifles that frequently resulted in fractures. Almost anyone who shoots an M40 much will report a broken firing pin. Of more significance, however, was the tendency of the gas system to clog up when corrosive ammunition was used and maintenance was marginal. In the Soviet armies of World War II, whose members were largely untrained and uneducated, it was not surprising that maintenance was often neglected. But perhaps the most important factor was that the rifles were used in extreme cold, conditions that will test any rifle.

All of these factors, plus the widespread availability of the PPsH 41 7.62x25mm SMG to provide long-range base of fire, meant that these Tokarev rifles were issued in limited quantities. Still, they were used and apparently well thought of by some people because the Germans issued captured examples and incorporated some of the Tokarev's design elements into German weapons developed during the war.

The sights on the M40 reminded me a lot of those found on the AK-47 and SKS rifles. Of course, this is not surprising, but as with those rifles, the M40 sights are hard to see because they are too dark and the rear notch is too shallow. The safety, a lever behind the trigger to block it, does its job in an acceptable fashion. With bare hands, there is no problem removing the lever, but with gloves on it is hard to remove, and with mittens it might be impossible. You would think such things would have been carefully



The safety on the M40 Tokarev in the on position, which blocks the trigger.

The magazine on the M40 Tokarev is removable, but the rifle was not designed to be used with rapidly detachable magazines

considered by Soviet designers who knew their soldiers would be fighting in those winter conditions.

The weapon has a muzzle brake installed, but I do not know whether it works or not because I did not take it off to try it without the brake. It does increase the noise level of the weapon, however, because an M91/30 is substantially quieter, and I attribute the noise level to the muzzle brake not the difference in barrel length. Given the weight of the weapon and barrel length, this brake would seem unnecessary. Because it requires an extra machining step, you would have thought that

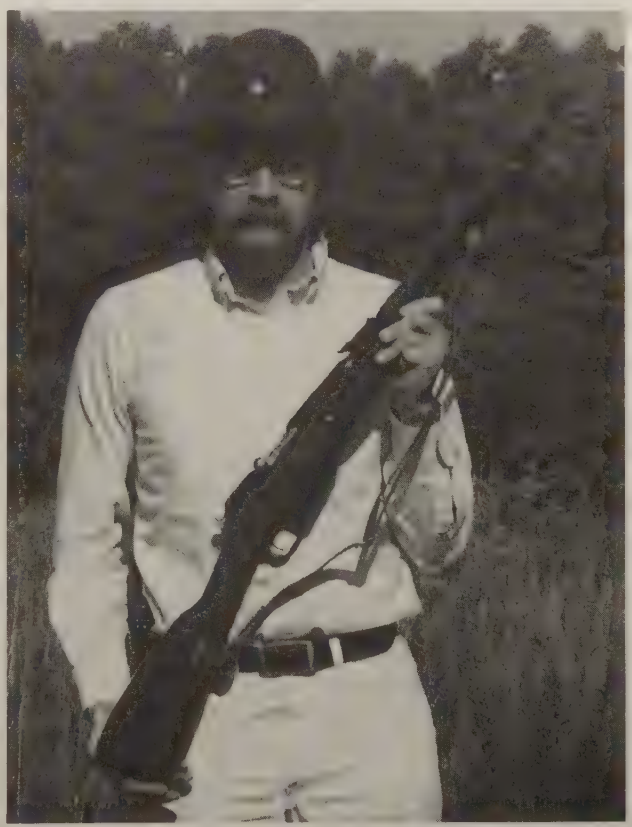
the Soviets under severe wartime restraints would have eliminated this. I also think it would kick up a lot of debris if fired in a dusty environment and or that it would kick up snow or blacken snow from the muzzle blast in the winter (the day I tested the Tokarev was in the high 90-degree range, so I do not know that for certain).

The trigger pull is hard and has a lot of creep in it. Off-hand shooting performance suffers as a result, although in the firmer kneeling/sitting position, it is not as big a problem. The magazine is removable, but the weapon is not really designed to be used with rapidly detachable and exchangeable magazines. Instead, the box merely holds the cartridges, and the shooter strips rounds through the top into the weapon. As with the M1 Garand, this limits the shooter's ability to reload at the proper time. Perhaps the Soviet soldier carried a spare magazine for such emergencies, but I doubt it—I have never seen a plentiful supply of spare magazines available for the weapon. I imagine the only way you would get the magazines would be to take them out of other men's rifles, not a method calculated to make you popular in your unit. The method of removing the magazine is slow and awkward, so even if you have a spare, reloading would not be as fast as we are accustomed to with our M14/M16 and AK-47-type rifles.

The Tokarev M40 is not a great battle rifle for all the reasons previously discussed, but it does feel well balanced in my hands. Even though scales show that it weighs as much as many rifles, it does not feel as heavy in my hands. If it had better sights and a detachable magazine, used rimless ammunition to avoid functioning problems, cured the firing pin problem, and featured a better safety and trigger guard system, it would have been a much better rifle. But, of course, then it would have been an M14 rifle rather than an M40, and I guess the designers of the M14 had the opportunity to look at the M40 and improve it when they designed the M14 in the 1950s.

MOSIN-NAGANT M44 CARBINE 7.62X54R

The Mosin-Nagant pattern of rifle was really obsolete by the time World War I started, yet it persisted throughout World War II and beyond. The rifles got shorter over time, but otherwise they did not differ substantially from the 1891 models. The test example was made in 1954 in Romania and was in new condition. I doubt whether anyone other than me had ever fired it outside the factory. Exactly why the Soviets continued to turn out M44 carbines when the AK-47, AKM, and SKS had already been adopted is a mystery, but I assume they had the production line going and preferred to build up their stocks of weapons rather than lay off



Even though it was obsolete by World War I, the Mosin-Nagant M44 has hung around and been used to fight a lot of enemies over a long period in various climates and terrains with quite a bit of success.

The spike bayonet on the M44 is permanently affixed and affects balance when folded and bullet point of aim when extended. Spike bayonets are better for penetrating thick clothes and web gear than blade bayonets, but the author would prefer a small knife and a lightweight pistol to any bayonet for real combat situations.

workers. Certainly, they did not build them so U.S. firearms testers could try them out 40 years later

The first thing I noticed when I picked up the M44 is that it quickly passed the jump test. Not a rattle was heard as I jumped up and down. Such a feature always endears itself to any old infantryman.

The rear sight also has finally been made at least somewhat practical: it is graduated from 100 to 1,000 meters, so you do not have to aim for the knees when firing within 300 meters of your target. The front sight is a cylindrical post and is well protected. In fact, it looks just like the sights on the AK-47 rifle. Although I do not like cylindrical posts because there is a tendency to shoot to the side with such items, I do like them a lot better than pyramid sights, which are impossible to use quickly. A little dab of white paint on the tip would go a long way toward improving it. Unfortunately, although finally graduated properly, the rear blade still is a shallow U notch, which is very difficult to use rapidly or in dim light. If this were my rifle, I would widen it out a bit and make it a square. That way, I could hold elevation and windage a lot better. As it is, the sights are hard to see and use, mainly because of the shallow U notch.

The rifle was obviously made as a military weapon and not a commercial sporter, yet the bolt has a high polish. That seems odd since it would reflect light. The action is smoother than on other Russian M91s tested, but I would still paint the highly polished bolt if I were carrying this rifle into battle.

The bayonet is meant to be constantly attached and is a sticker, not a slasher. The weight of the rifle and design of the bayonet do allow good penetration, yet I still think a sharp edge would be desirable. Better yet would be the combination of a Boy Scout knife and air-weight Chief's Special Smith & Wesson .38 revolver. The mounting is firm, yet the bayonet locks and unlocks easily and does not rattle. I would remove it to save the weight if this were my battle rifle.

As might be expected with the shorter barrel and light weight, the recoil and blast are slightly greater than when with a full-length rifle. However, neither was oppressive, and neither impeded the quick operation of the weapon. Design flaws make the action slow to operate, not recoil.

As might be expected, the M44 carbine still has no effective safety, so I suppose the experience of a half-century had established that it is not necessary.

The rifle does not have a butt trap, but it does have a cleaning rod. Still, a butt trap containing an oil bottle, a few brushes, and patches would help maintain the weapon with very little extra trouble. Certainly, the Mosin-Nagant rifle has earned a reputation as a sturdy rifle, but keeping the cleaning equipment and supplies with the rifle is one way to make certain that rifles are properly maintained.

The M44 is a handy piece of equipment. Although it is slightly muzzle heavy for off-

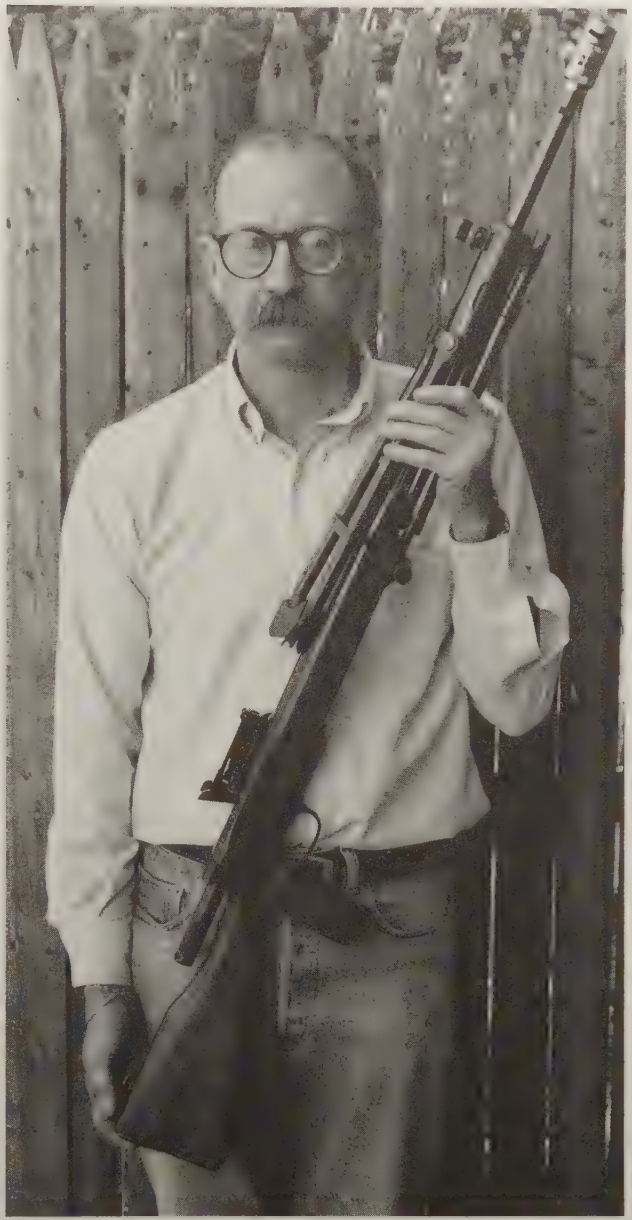
hand and kneeling shooting (primarily because of the heavy metal present on the end of the barrel, the bayonet), at least it is short so that handling it around buildings and vehicles is not as clumsy as it is with the M91 rifle. Simply removing the bayonet reduces the muzzle heaviness and turns the M91 into a well-balanced rifle for serious combat use, although still limited by its poor sights (mainly), sticking action, and lack of safety (to an extent). Still, it represents a definite improvement over the M91 rifle, and a person offered one should not turn up his nose. The M44 has fought a lot of enemies over a long period in various climates and terrains with quite a bit of success.

DEGTYAREV DP & DPM LIGHT MACHINE GUN

This is the famous pan-style magazine Soviet LMG of World War II fame. Subsequent to the war, it was copied by Communist China and other countries. The model tested was the Chinese-manufactured DPM gun, called the Type 53 LMG by the Chinese.

When evaluating this weapon, you must recall that it was designed in the 1920s and, thus, many of the design features that we have come to expect today (such as detachable barrels and ease of replacing and refilling magazines) are missing. Perhaps the best weapons to compare it with are the U.S. BAR and the Lewis guns.

Unlike the DP model, the DPM has the recoil springs in the butt rather than surrounding the barrels. This change dates from 1944. Apparently, the Soviet forces would fire such long and constant bursts from the weapons that the springs would overheat, and relocating them to the butt eliminated this problem. It shows also that the weapons are reliable and long lasting. The safety on the DPM is also different: because it is a bar that blocks the trigger it is more like that found on the SKS rather than the grip safety found on the DP. Of course, in my judgment, safeties on any open-bolt LMG are rather silly. I would not trust any such safeties; instead, I prefer to cock the weapon when ready to fire and leave the bolt closed on an empty chamber until ready to fire.



The author holds the Chinese-made Degtyarev DPM light machine gun that features a McArthur brake (gun from the John Ross collection).

The sights on the DPM consist of a post that adjusts for elevation and a tangent rear with V opening. You may adjust the windage by loosening the screw on the front sight and

Soviet troops armed with a Degtyarev light machine gun Model DP (foreground) and Sudarev PPS 1943 submachine guns fighting northwest of Mariampol on the East Prussian frontier in August 1944.

The right side view of the Chinese DPM 7.62x54R LMG.

moving it to either side. Both sights are well protected by wings.

The weapon has a bipod that is attached to the weapon, I found it most usable in the prone position because of the weapon's weight. I could fire it from the kneeling position, but frankly I found it too heavy and ill balanced to be used in the off-hand position. When used with the bipod, the weapon should be pulled firmly to the shoulder to put tension on the bipod, thus getting the maximum benefit from the unit.

The weapon has a three-position gas regulation, which is always nice for any weapon that will be used in varying climates with ammunition of differing quality and in weapons that are fired a lot and thus become dirty.

At 600 RPM, the cyclic rate is not particularly slow, but I found that I could fire single shots without much difficulty, and three-shot bursts were a breeze. The weapon is not a selective-fire LMG. Rather interestingly, when I was testing it at 350 yards (measured) on a chest-sized metal plate from the prone position (shooting incendiary ammunition so that watching strikes was easy for my observer John Ross), I found that I frequently could keep two rounds of the burst on the chest-sized target but never three. The first round would hit center, the next about 6 to 8 inches up and 4 inches right, and the last would hit off the right-hand corner by 4 inches or so. There were also a number of times when the burst went completely around the plate but never hit it—which explains how people can be totally missed by machine gun fire yet have all their web gear shot off. Just such a thing happened in Vietnam to a man I was in ROTC with when he assaulted a North Vietnamese position. The machine gunner shot off his web gear but did not hit him. Perhaps that NVA trooper had a DPM that day. Although three- to five-round bursts are the proper way to fire LMGs, as we all know, it is always fun to see what happens when we fire 15 to 20 rounds in one burst. Doing that with a DPM at 350 yards from the prone position will result in many strikes on the plates and none more than 12 inches off the plate in any direction. That is what I would call good results.

The biggest problems with the DPM are its length and balance. Because of the length of the barrel, the bipod, the barrel tube, and the pan magazine that holds 47 rounds of 7.62xmm54R ammunition, most of the weight is at front, which adversely affects balance. The lack of a forearm makes for a difficult weapon to carry: there is nothing for the left hand to hold onto as you "walk through the woods" with this LMG.

The other major problem is the its loading system, namely the drum. Drums are supposed to have a leather tab on them that you use to pull the spring back to load the magazine with loose ammunition. Naturally, this tab soon breaks, especially given the pressure on the spring. You then have to try to push the small screw with your finger or wrap a piece of wire around it to pull it. In either event, it is difficult if not impossible for one person to load these pan magazines. Even two people find it difficult to do quickly. I suppose you should have plenty of drums loaded prior to the attack, but this system still leaves a lot to be desired. I tested my DPM on a warm day. Loading a drum at night or in the cold of Russia or Korea must have been something to really dread.

Once it is loaded, you then need to place the pan magazine in location carefully. To do that, you must pull the latch to the rear and insert the magazine carefully into position. Again, this is not an operation to be done carelessly. I suppose if you did it a lot, it would be easier, but I found it much more difficult to fit the drum in place than to stick a magazine in a BAR or Bren.

The other bad feature arising from the drum is that when you carry the weapon, you must reach around the drum because otherwise it hits the inside of your arm. It makes an uncomfortable carry position when you are cradling the weapon in your arms, as you commonly will do with an LMG. On the

positive side, the drum does allow you to have a low profile both for prone positions and height considerations. Further, being flat, you can use conventional sights rather than offset sights. Because the magazine is top mounted, gravity assists the feeding process. Last, the 47-round magazine gives a 34-percent larger capacity than the Bren or similar box-magazine LMG.

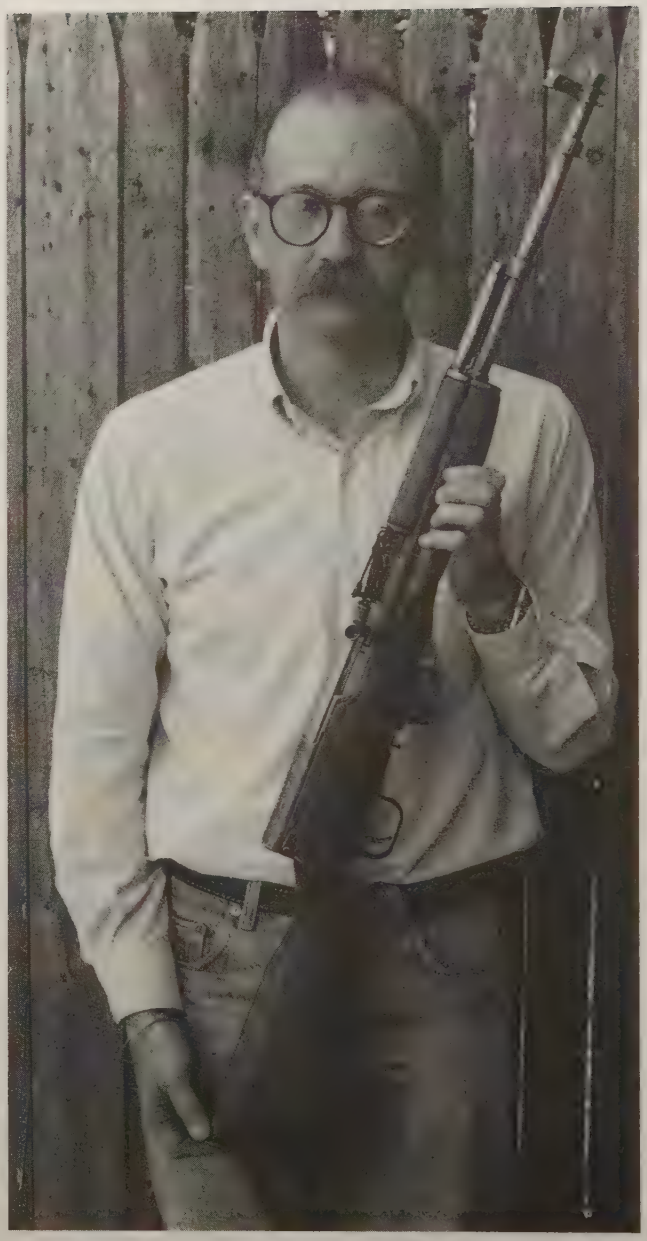
As noted, the DPM has drawbacks, but the reliability and good practical shooting qualities of the gun reduce the criticisms that can legitimately be made against it. This gun has proven itself over a long time under some of the worst possible conditions when used by troops who had limited maintenance equipment or little proper training. We can build a better LMG today, but when this one came on the scene, it offered many good features.

SKS

The SKS was one of the most common Vietnam war trophies for U.S. servicemen. It was not a full-auto weapon like the AK-47 and not a U.S.-made gun, so it could be readily imported as a war trophy at the time. In fact, until 1966/67, the standard rifle of North Vietnamese Army (NVA) forces seemed to be the SKS. Only in later years did the AK-47 become common in NVA units.

This rifle was originally developed as the standard Soviet Infantry rifle in the post-World War II era. Later, the AK-47, which had originally been seen as a replacement for the PPsH 41/PPH43 SMG, was adopted and gradually displaced the SKS as the standard service rifle. Of course, thousands of SKS rifles had been made before this became obvious, and they were either stored or given away to Soviet allies in the Third World.

The Chinese also built a copy of the SKS, and copies of it were given liberally to the North Vietnamese in the late 1950s and early 1960s. These rifles would have remained rare collectibles with hard-to-get ammunition except for the opening of trade with China and the destruction of the Soviet Union.



The SKS was one of the most common Vietnam war trophies for U.S. servicemen. Here the author holds a Russian-made SKS that is missing its bayonet.

According to sources that I have read, more than two million SKS rifles had been brought into the Unites States from China by mid-1994, so they are no longer rare.

Within certain limitations, the SKS is a good rifle: it is lightweight, shoots an adequate cartridge, and has light recoil as a result of its cartridge and its being a

semiautomatic. These features are always welcomed by the less serious shooters.

The front sight on the SKS is very similar to that found on the AK-47 in terms of shape and adjustment. A large ring (cut open at the top to admit both light and sight adjustment tools) protects the sight from blows. The rear sight is U shaped and works on a tangent. I find it very difficult to maintain a proper sight picture with such sights, and cutting the U into a wider V makes a much better sight picture. I also find that a dab of white paint on the front sight helps quite a bit.

The gas system used on the SKS has proven itself extremely reliable over the years under very difficult circumstances. More important for the serious shooter who may be using corrosive ammunition, the bore on this rifle is chrome lined. It is very difficult to find a poor bore on an SKS or AK-47, which has a chromed barrel as well. Once the technology became available to chrome bores, it seems to me that all military rifles should have incorporated such bores.

Trigger pull on the SKS is never very great, but then it does have a heavy slamming bolt going back and forth, and fine trigger pull and bolt slamming do not go together. Its pull is about 6 to 8 pounds and has the to-be-expected initial pull-up before pulling the last 6 to 8 pounds. The safety will strike the finger when applied and thereby alert the shooter to the presence of the safety. It cannot simply be flipped off, but it is much faster to remove than the safety on the AK-47 rifles. Very few military rifles have safeties that are suitable for jump shooters while walking through brush, and the SKS is no exception. Unlike many bolt-action weapons on which you can leave the bolt open slightly and rapidly close it when ready to shoot, thereby ignoring the safety completely, you cannot do this with a semiautomatic SKS. Although the safety is not as quick as that found on an M16 or M14, it is still not impossibly slow to operate.

The SKS loads with a 10-shot stripper clip, using an integral 10-shot magazine. About the best you can say is that it is better than the 5-shot stripper clips used in many other military weapons. The Type 68 SKS (or its commercial counterparts) that use detachable AK-47 magazines are much better.

The stock on the SKS is either wood or plastic. Both are of a good length, although some long-armed people who shoot in shirtsleeves complain that they are too short. If these long-armed people were bundled up in extra clothes, they would think differently. Even more to the point, for the average Asian or Central European, such stocks are fine. Also, if you are tall you can shoot a short stock efficiently, even if somewhat uncomfortably, but you cannot do the reverse. Thus, too short is better than too long.

The safety on the SKS rifle is not as quick as that found on the M16 or M14, but it is faster than the one on the AK-47. It is on in this photo.

The buttplate on the SKS is metal and contains cleaning gear to help maintain the rifle. Many SKS rifles have a knife bayonet, whereas others carry a spike unit. Both are worthless and are frequently removed the closer to the front lines because they add weight and tend to rattle during night patrols.

Invariably, the argument arises as to whether the SKS or AK-47 is the better "battle rifle." If we simply compare a fixed-stock AK-47 with a standard SKS, then I must quickly answer the AK-47. I like the SKS safety better, but not so much better than I am willing to forgo a rapidly detachable 30-round magazine. Many people have said that the SKS is more accurate than the AK-47. Both of my AK-47s (one a fixed stock, the other a folder) are Chinese guns. Both will shoot into 9 inches at 300 yards from the prone position, and I consider this more than acceptable for open-sight short-barreled rifles firing the 7.62x39mm cartridge. Now if you offer me a Type 68 (or SKS with detachable magazine) and ask me the same question, the choice would be a lot harder because both rifles are reliable, chamber the same cartridge, and (in my experiences, at least) have equal accuracy. I think the noisy safety of the AK-47 would cause it to lose out to the quieter SKS unit, however, in the final analysis.

AK-47

Along with the Mauser rifle, the AK-47 and its variants must be the most popular rifle design in the world. It may even be more popular and widespread than the Mauser. I have read that more than 60 million AK-47 rifles have been manufactured, and that does not even count the rifles that have a similar design, such as the Galil and South African R4/5 rifles.

AK-47s are rugged and reliable rifles and in all likelihood will still be used in wars around the world as long as cartridge weapons are used. When I was in the U.S. Army, I have to admit that I looked down my nose at the AK-47. Now, I put that down to a lack of an opportunity to actually test the weapon or use it over a long period when I would be able to evaluate carefully the results of my shooting. Firing a few bursts at C-ration boxes thrown out in a field from the off-hand position without earmuffs is not the way to determine whether or not a rifle is suitable. What you need to do is fire 10,000 to 12,000 rounds through the rifle over a 10-year period in situations where you can record your results with care. If you do that with an AK-47, you will soon determine that it is a fine rifle.

AK-47 rifles are manufactured all over the world and, while the finishings and furniture on the weapon will vary depending on the manufacturer, the system remains consistent. The rifles are by no means lightweight but, the shortness of the barrel makes them quite handy and, to my mind anyway, nicely balanced.

Although there are variants of the AK-47 available in different calibers, I will concern myself in this review with only the 7.62x39mm version (elsewhere I will discuss the 5.56x45mm and 5.45x39mm versions). It is true that the 7.62x39mm cartridge is no powerhorse, but it is within 10 percent of the power level of that ever-popular deer cartridge, the .30-30 Winchester. Additionally, many excellent rounds are available, and the 7.62x39mm loading typically uses a steel-core projectile, improving penetration to the point that it is almost equal to the 7.62x51mm NATO ball rounds, even though the 7.62x39mm bullet weighs 122 grains in contrast to 148 grains for the 7.62x51mm and goes 300 to 400 fps slower than its NATO counterpart. Last, there are other rounds (such as incendiary and tracer) available that will enhance the 7.62x39mm cartridge's performance on target. One limitation of the 7.62x39mm (in my opinion) is that its trajectory is high, limiting its usefulness as a sniper round; but neither it nor the AK-47 rifle system was designed for long-range work.

Starting at the rear of the weapon, the AK-47 is available with either a fixed or a collapsible stock. Fixed stocks are constructed of various woods and in a variety of ways,

The AK-47 is one of the most favored rifle designs in the world and is often found in the hands of guerrilla armies.

from the solid one-piece stock found on Chinese guns to the pinned and laminated affair found on Egyptian weapons. Many people find the AK-47 stock too short. Being of average height, 5 feet 9 inches, I do not. Additionally, as discussed earlier, when you put on layers of clothing, including ballistic armor, the stock is lengthened, and a short stock can be handled by someone who could use a longer stock, whereas a long stock is totally unacceptable for someone who needs a short stock.

Besides the fixed wood stock, stocks are made of plastic and, on the Finnish M60/62 variants, a tube stock is used. I prefer the wood. They are firmly fixed to the rear of the weapon, and I have never seen one broken, which is more than I can say for the M16A1 buttstock. Because the stock does not contain any portion of the firing mechanism, the weapon will still fire even if the stock is broken off. The buttstock contains a trapdoor to where a cleaning kit is stored. This, in addition to the cleaning rod that comes with many models of the weapon, allows the shooter to maintain the weapon in the field. I like such butt-trap cleaning gear.

Naturally, folding stocks do not contain such equipment. Folders come in two basic versions: the underfolder and the sidefolder. The sidefolder seems sturdier and is more readily extended. However, such units are rare, coming in only at the tail end of the production run. More common is the underfolder, in all likelihood copied from the German MP40 SMG. Even though it is often rigid when new, the underfolder becomes unstable and has a pronounced wobble.

In my opinion, the fixed stock is better unless storage is a real (not imagined) problem and you need the more compact folding stock. And never shoot the rifle with the stock still folded if you wish to get good on-target results. With the underfolder stock and a loaded magazine in the rifle, the clearance is so tight when extending the stock that you have to be very careful to avoid crushing your finger between the stock buttplate and the magazine. Also, when you fire, the rails on the stock will hit your jawbone if you are taking a proper position on the stock prior to firing. As I have discovered, this can be very uncomfortable over a long day's shooting.

The folding stock on this Chinese Type 56 (AKM) 7.62x39mm rifle makes this a compact weapon, but the stock struts hit the shooter's cheek when the weapon is shot. Also, the catch will wear in time and become wobbly.

This photo illustrates how the folding butt piece on the Chinese Type 56 (AKM) will barely clear when a 30-round magazine is in place.

The pistol grip on the AK-47 comes in a variety of shapes and materials. The standard seems to be the plastic or wooden grip familiar to most of us. The Soviet pattern is slightly more rounded than the Chinese version, which feels slightly slick in my hand. Neither has a trap for oil or cleaning accessories. The Hungarian copies have a large swell on the bottom to keep the hand from slipping off the grip, which can happen with the Chinese pattern if the shooter's hands are cold or slippery, but this is advantage offset by the slablike nature of the Hungarian grip. The most unusual style is found on the Finnish M60/62 series of AK-47, which has a simple, round, plastic tube-like grip. I suppose the ridges are intended to prevent the shooter's hands from slipping, but they give the stock a "ropelike" feel in my hand that is never entirely comfortable.

The trigger guard on the AK-47 does not

fold down or away as it does on the M16 or SIG 550 rifles. This is odd, given the size of the trigger guard and the country where it was developed. Although this problem never surfaced in Vietnam, getting your mittened hand into the AK-47's trigger guard is a problem and it must have arisen in some of the areas the weapon has been used. The Finns developed a guardless trigger mechanism for their M60, but it was later changed to a typical trigger guard, so perhaps they have had too many accidental firings. A multiclimate rifle really should have a guard that can be folded out of the way. Winter trigger systems that must be added on (such as those for the M98 Mauser, M1 Garand, and M14) are unlikely to be available when needed, in my experience.

The magazine and magazine release system on the AK-47 is one of the rifle's finest features. It can be used with either hand and holds the magazine firmly in place. Although heavy, the lips on the magazine are rugged and reliable. But it is better to have a magazine that is heavy and works than a light one that fails to feed. Magazine releases with a central flipper are desirable because they can be used easily with either hand. It would be better if the flipper were slightly longer because it would be easier to disengage quickly, especially in bad weather, but even so it is not bad. AK-47 magazines do need to be rocked into place front to rear, which means that you have to slide it up and in toward you in one continuous motion rather than simply pushing up. This will cause the prone shooter to expose more of his body than is desirable, but it also requires less force to load the weapon because he has leverage working with him.

The sling swivels on the AK-47 are located on the bottom toe of the stock and then firmly welded to the side of the barrel/gas system. This limits your ability to carry the weapon in "assault carry" mode, but it does make for a firm swivel point. Most AK-47 slings use a metal stud to hold the sling in place on the front sling point. This can hit the metal on the weapon, which makes a very distinctive noise, especially at night. If you use a sling, tape this metal stud down to avoid metal-on-metal contact.

Some AK-47 rifles have a folding bayonet attached to the rifle whereas others have a cleaning rod slung under the barrel. I am not a big fan of bayonets (except for prisoner intimidation) and removed the bayonet from my Chinese rifle. I would rather have the weight in an alloy-frame .38 revolver. The muzzle of the AK-47 is frequently threaded. Some models sport a slanted-type device designed to be a muzzle brake, others are merely capped with a bushing, and certain models, such as the Finnish M60/M62, have a fairly involved combined muzzle brake/bayonet mounting point. I am not convinced that the muzzle-brake-type bushing really works. I always get a little uneasy around anything that throws gas off in one direction, only because I think it would adversely affect accuracy. If you want a muzzle brake, get Bruce McArthur to build one for you. Your ears might hurt, but your shoulder certainly will not.

The front sight on the AK is similar on all the models except for the sight guard. On the Soviet pattern, the sight guard merely protects the front sight from the side and is open at the top. On the Chinese version, a circle of metal goes around the sight, but unlike on the G3 series, it is open at the top. This opening allows access for the insertion of a sight-adjusting tool and for light to reach the sight, thereby avoiding too much shade on the sight. Both versions seem to work fine, but the Chinese version seems slightly more rugged in case the rifle is dropped straight down. Unfortunately, the sight post is rounded rather than having the more visible blade shape and is black. White paint will fix the latter point, but not the former. The Finnish models have a night sight that uses radium paint in large dots rather than radioactive elements, as is found on many Western units. The Finnish solution is cheaper and actually just as bright. Add-on units are Soviet weapons, but I have never

seen one on a Chinese or Korean model (though they may exist).

The handguard on the AK-47 comes in two basic patterns: Soviet and Chinese. The Soviet pattern has a large swell to hold on to, whereas the Chinese is thinner. Both get hot with prolonged firing. My friend John Ross got his Chinese handguard to catch fire with long, repeated magazine-capacity bursts. I have never seen a Soviet handguard catch fire, but I see no reason that it would not, although it may take a little longer because it is thicker. I have fired mine long enough to get the inside of the handguards scorched. The handguard on all the typical AKs cover the top gas system tube, which is fortunate because it gets very hot. On the other hand, the Finnish M60/M62 rifles have a plastic handguard; this arrangement is not as comfortable to hold and is open at the top, leaving the gas tube exposed to burn a hand severely. Given the climate in Finland, this is probably not a real problem—or perhaps the Finns simply never have had an opportunity to shoot them long enough under combat conditions to realize that the problem exists.

The gas system on the AK-47 is known worldwide for its ruggedness and dependability. Although I prefer gas systems that can be adjusted for conditions, it is only fair to say that the AK-47 system works fine and there seems to be no problem with part breakage caused by overpressure in the gas system. By not having a gas-adjusting system, a military saves money and avoids poorly trained soldiers or guerrillas from reducing their rifles to awkward single loaders.

The cocking handle on the AK-47 is on the right side. Except on the Galil modification, this means that you must use your trigger hand to pull the bolt to the rear. With the Galil modification, you can use either hand, and it should be adopted by the AK-47 manufacturers also.

Other than on the Finnish series of AK-47s, the rifles all use a sliding-target rear sight adjusted to 1,000 meters in early rifles and 800 in most recent rifles. The rear has a small U shape to it that I find difficult to use. On my personal rifle, I took a small file and converted it to a V shape and widened the top about 50 percent. My shooting ability went up at least 50 percent, perhaps more. Try it and see whether or not you get better results.

On the Finnish M60/62 rifles, the top cover, which is loosely fitted on most rifles, is tightly fitted and has a sliding-ramp peep sight installed. The front sight on Finnish rifles is mounted on the gas tube system; on the standard AK-47, it is located at the end of the barrel. Sight radius on both styles is about the same. As long as the top cover remains tight on the action, it seems to be a good system. The same method is used on the Galil rifles. Both, it might be noted, use machined receivers rather than stamped models. Perhaps this is why both the Finns and Israelis use this method of mounting sights. I prefer the peep sights to open rear notches, but with my modified rear sight, I can shoot as well with an AK-74 as I can with an M62 Finnish rifle.

The accuracy of the AK-47 has always been a point of dispute between people. Because of my own unfamiliarity with the series, I used to condemn the rifles as inaccurate, but I was wrong. Using a standard Chinese AK-47 with open sights and good ammunition, I can keep five shots into 9 inches at 300 yards from a prone position . . . not too shabby in my opinion. Try firing an AK-47 as a real rifle is meant to be shot, and not simply blasting bursts off-hand at C-ration boxes, and you may be pleasantly surprised.

The safety system on the AK-47 is one of the few real drawbacks to the weapon design. It can be applied or disengaged easily only with the shooting hand, although you can reach over the receiver and use your nonshooting hand (assuming you are right-handed). Either way, however, it is a slow proposition. You cannot simply flip it off when a jump shot appears. Further, it makes a distinctive click when you move it. Many people bend the safety slightly to make it looser on the receiver and thus avoid the

click, as well as making it much easier and quicker to remove. Doing that, however, will result in more dust and dirt getting into the action because the safety also acts as a dust cover. Even when you do that, it still is not as fast to remove as the safety on the M14 or M16 rifle.

The trigger on the AK-47 is very similar to that found on the M1 Garand. All the examples I have encountered here have been quite good for a selective-fire battle rifle. The trigger system is much better than that found on a G3. It is never going to be confused with a match rifle, but it is surprisingly good.

One last feature of note is the chrome-lined barrel of the AK-47 rifle. All battle rifles should be so furnished: cleaning rifles in a military environment is often a hit-or-miss proposition, and many of the nations that use the AK-47 also use corrosive-primed ammunition. When corrosive ammunition is being used, you should look to the gas system to uncover fouling and not the bore, which will often appear spotless even when maintenance is overlooked or ignored.

I like the AK-47 rifle, and I like the cartridge. I do not think it makes a lot of sense when fired in full-auto mode, but as a semiautomatic rifle, it ranks right up at the top. If the designers could modify the safety system to make it faster to get off when you encounter a sudden shot, I would be content with it. The Galil does this and keeps all of the AK-47's good points, but Galil rifles are only available in 5.56mm or 7.62mm NATO. I prefer the 7.62x39 to 5.56mm. Although I like the 7.62mm NATO cartridge, it is heavier to carry on a long walk. Thus, I prefer the 7.62x39mm, given the fine loadings available for that cartridge.

DRAGUNOV SNIPER RIFLE—7.62x54MM

The Dragunov is an interesting development in that the Soviets took the standard AK-47 action and modified it to fire the longer 7.62x54R cartridge, which is rimmed also. In doing so, they attempted to develop a self-loading, sniping rifle. Of course, semiautomatic sniping rifles were not new to the Soviets; they had fielded them in the form of M40 Tokarev rifles in World War II, but other than being perhaps a more reliable design, it would appear that the Soviets learned little from their experiences. Obviously, the semiauto sniper rifle does offer one advantage over a bolt-action rifle: the shooter does not have to move to reload the rifle, and sometimes it is the movement of the sniper working the action that will give him away more than the noise.

Unfortunately, semiautomatics cause problems as well. The main one involves the trigger system: because the rifle must have a trigger that will not double (or fire a second round without a pull of the trigger), the trigger pull will typically be much heavier than the pull on an equal-quality bolt-action rifle. Additionally, movement of the bolt flying back and forth will create some stresses on the rifle that will affect the scope and its mountings, which does not happen in the manual loader.

Still, military people all want to go to the semiautomatic rifle and go to great expense to accomplish this end. The Dragunov's trigger pull is little better than that found on the typical AKM rifle. The rear sight is an open V-notch unit very similar to those found on AK-47 rifles, and the front sight is nearly identical to that found on the AK-47. I suppose the idea is to make it easier for the Soviet soldier to adjust to the sights if the telescopic sights get out of order.

Similarly, the safety is the standard AK-47-style safety: slow to disengage, noisy when moved, and positioned in a fashion that does not allow the shooting hand to stay in position when moving it or it to be used by a left-handed shooter.

The barrel is long and surprisingly light in weight. This makes the flash and report equal to those of an M91 Mosin-Nagant rifle with a similar-length barrel. Unfortunately, that long barrel—coupled with the long receiver

necessary for use with the 7.62x54R cartridge—makes the whole package long and rather unwieldy.

The action uses the two-piece stock, and the front handguard strikes the barrel in such a manner that I would fear the pressure of the handguard throwing off some shots. Additionally, the barrel's weight and the way the handguard is set up almost guarantee that the bullet will shift impact areas if the shooter uses a

The Soviet 7.62x54mm Dragunov sniper rifle is essentially a standard AK-47 action modified to shoot the longer 7.62x54R cartridge,

The Dragunov sniper rifle should be considered more a "sharpshooter rifle" than a "sniper rifle."

sling since it will tend to put side pressure on the barrel. Being unable to use the sling properly as a shooting sling, not a carrying strap, the shooter will not be able to hold the rifle as steady as would be possible if a shooting sling were used. Practical accuracy will thus suffer.

The scope is heavy, and it has a heavy mount. The optics are not as good as those of commercial scopes made in the mid-1980s in the United States, and the power is too low for really effective use at ranges more than 800 meters.

As with World War II Soviet sniper rifles, it might be best to view the Soviet sniper rifles more as sharpshooter rifles than actual sniper rifles. Because of their design limitations, an effective range of 800 meters (or, in fact, generally 25 percent less than this) is about all that can be expected of these sniper rifles.

RPD LMG

This was possibly the most common squad automatic weapon found in the hands of the North Vietnamese Army during the Vietnam War. It is an excellent squad automatic weapon, although it is perhaps not up to LMG standards because of the 7.62x39mm cartridge it fires.

Although the catalogs state that it has an 800-meter effective range, when I tested the RPD I found that 600 meters was really more like it unless you had access to a lot of tracer rounds and a good observer. If you had those two things, then you could walk your rounds onto the target at 800 meters. Otherwise, given the low velocity of the 7.62x39mm cartridge, the subsequent high trajectory, and the general difficulty of estimating ranges, 600 meters is about it. But 600 meters is still a long way in actual fighting, especially for what is really a squad automatic weapon.

The problem with most such weapons is that they are too heavy and have too much recoil to be effective. The RPD weighs only 16 pounds, and because of this its cartridge recoil is light. Although the weapon fires only in the full-automatic mode, firing single shots is not difficult and three- to five-round bursts are easy. The weapon lacks a quick-change barrel, but it fires from an open bolt, which allows you to avoid cook-offs, and the handguard covers both the top and bottom of the barrel, so the shooter can avoid accidentally burning his hand. With the low-intensity 7.62x39mm cartridge, the weapon, if used properly in a squad role, is not likely to get too

The RPD, though termed a light machine gun, actually makes a better squad automatic weapon than an LMG because of its 7.62x39mm cartridge.

hot to be safely shot, unlike the results encountered with the M249 5.56x45mm squad automatic weapon.

The front sight is covered with a strong circle of metal to avoid accidental injury to the sight. Sight adjustments are made for both windage and elevation on the front. Once the sight is zeroed, you use the rear tangent to get different elevations. Spend the necessary time to get it sighted properly at 100 yards. It is always a lot of work to properly sight in an open-bolt machine gun, but it is work well rewarded if you need to really shoot and hit targets. The last time I sighted in an RPD, I spent about four hours doing it with many a walk back and forth, but later when I shot it across a field at 600 meters, I was well pleased to crank up the tangent rear sight to 600 and then aim dead onto the target and watch my rounds hit the desired area.

The weapon has a safety, but as with all open-bolt guns, ignore it. The bolt handle is on the right, and it is not particularly easy for the left-handed shooter to use. Putting an L-shaped handle on the bolt would make it easier to be used by either hand. The pistol grip is really too straight for comfort; a slightly greater angle to it would make it much more instinctive. Push back the top plate latch, pop open the top of the weapon, lay the belt on the now-open receiver, or put the belt in the drum and carry it in the drum attached to the gun. By doing that, you avoid getting the belts dirty, which always creates malfunctions. Loose belts are better for defensive positions, but placing the belts in the drum is the way to go for field operations. It takes quite a lot of practice to fit the 100-round belt into the drum, but it can be done. Once in, the feeding is good, but the ammunition will shift back and forth on the march. Each time it moves, it rattles, and anyone hearing the noise knows it is the RPD magazine. This can prove deadly on night patrols. I know of no real way to muffle it.

The weapon is light and handy enough to allow you to cradle the weapon much like a rifle when walking, which is nice. I find it almost light enough to be shot off-hand with comfort, but the heavy drum hanging below does make the balance less than ideal for off-hand work. If you try it with only a short 10-round belt hanging out, it is really quite acceptable. The drums are interchangeable among guns because they do not fit into the feed mechanism, unlike on many Soviet designs, and you can carry a number of filled drums when you go to the field. Loading the belts by hand is difficult, but there are loading machines that will do this without much effort.

My favorite stories about the RPD come from two friends who used the weapon for different things but whose stories both illustrate the qualities of the gun. My friend Kent Lomont tells of a client of his who had six RPDs. This individual shot them in an underground bunker with a coal-dust floor. He would shoot one on full-automatic continuous burst until the barrel turned red hot and then he would drop it in the dust and pick up the next one. When he got to the end of the line, he would pick up the first one and begin again. In a remarkable display of durability, the guns all worked without a single hang-up. On the other side of the world, a friend in the Selous Scouts used his RPD during an invasion of Mozambique to kill more than 200 African terrorists one morning without missing a beat. These stories confirm the durability and reliability of the RPD in both recreational and combat use.

Despite the fact that I prefer a quick-change barrel and am not totally convinced that the 7.62x39mm cartridge is the best round for a squad automatic weapon, I like the RPD a lot. The only major fault I can find with it is the noisy drums. Perhaps wrapping a canvas bag around them would dampen the sound enough for a night patrol. I admit to being very concerned about rattling equipment, but that comes from nighttime patrolling experience, I suppose—I have heard others walk along quite happily, sounding like a kitchen on the move. Ultimately, the RPD was replaced by the RPK, which is merely a longer-, heavier-barreled AK-47. The RPK eliminates the noise problem by

The RPK was designed to replace the RPD. Here, the author holds a Yugoslav RPK 7.62x39mm.

using 40-round magazines, but it does fire from a closed bolt and has 60-percent less capacity in a "punch up." I have used both and favor the RPD.

RPK

The RPK was designed to replace the RPD. In many aspects, it may be viewed as simply a heavier rifle because it is identical to the AKM rifle except for its buttstocked design and the length and weight of its barrel. It shoots the same cartridge, uses the same action, and has the same sights. My comments about the various aspects of the AK-47 or AKM apply to the RPK as well. The weapon is somewhat heavy at 11 pounds, but this makes it more stable in full-auto fire. As does the AK-47, the RPK fires from a closed bolt. Naturally, this limits the ability to fire extended bursts. Additionally, it lacks a quick-change barrel, which similarly limits its use as a LMG.

The RPK is a true squad automatic weapon; it was not designed to be a platoon-level LMG. The RPD can be stretched to perform as an LMG role, but the RPK cannot.

One plus with this weapon is that soldiers who are familiar with the AK-47 system can use the RPK without retraining. Also, the RPK uses a superior cartridge-carrying system to that on the RPD. One of the problems with the RPD has always been that the ammunition rattles in the drum. The RPD uses a standard 30-round magazine from the AK-47, a unique 40-round magazine, or a 75-round drum that does not have the ammunition on links. The ammunition in the RPK drum will rattle a bit but not like that in the RPD drum. The 40- or 30-shot magazines avoid that completely. The 40-round magazine, however, causes the weapon to hit the ground when fired in the prone position, so you should fire it off the bipod.

The RPK can be easily fired from the shoulder like a conventional rifle because it balances well and fires from a closed bolt. It is no more awkward than a G3 or FAL in that regard.

Firing from the closed bolt allows much greater accuracy than is found on any open-bolt gun, but naturally it limits your ability to fire extended periods of time. I have never encountered a cook-off in any rifle, even when large numbers of rounds have been fired in short order, but it is only fair to note that a full-auto squad automatic is likely to be fired longer and harder than a conventional infantry battle rifle. Therefore, a cook-off is

always a possibility. I suggest removing the magazine slightly (when firing is over) for a while and then pulling the bolt back, ejecting the cartridge (thereby, allowing the bolt to go forward on an empty chamber), and then pushing the magazine home again. By following this procedure, no cook-off would be possible. When you are ready to fire, simply pull the bolt to the rear again. If the RPK had a bolt-hold-open device, it would be even better, but as with its AK-47 counterpart, no such device is available. Similarly, once the ammunition is depleted, the RPK does not lock open. The standard remedy is to put three tracers in the end of a magazine, and when you see red (or green), it is time to change. That only works when you have the ammunition and can risk shooting it. There are times when neither is feasible.

The soldier issued the RPK should, I believe, be taught to use it as a rapid-firing semiauto weapon whose increased weight allows for more rapid recoil recovery and, hence, faster semiauto fire. Firepower is hitting people, and with proper semiauto fire in an RPK, you will get better results at 600 meters than with three-shot bursts fired from an RPD. On the other hand, the heavier weight of the RPD will get you better results at that same distance if both weapons are fired in the full-auto mode.

There are things I like about the closed-bolt RPK: its accuracy, lighter weight, rattleless box magazines, and less-rattle-prone drums. But I cannot help thinking that the RPK is not really a squad auto weapon—much less an LMG—but is really only a heavier than normal AK-47. Therefore, I must ask myself would I not be better off with a standard AK with the drums or 40-round box magazines and use semiauto fire until a close-range emergency presented itself? I could save 2 to 3 pounds in weight and not give enemy snipers cause to notice me by my carrying an unusual weapon. When I need long-term, high-volume full-auto fire—the type of fire that wins battles—I would go with an RPD or better yet a PK, MAG-58, or M2HB .50-caliber. It is an interesting point, one worthy of much consideration, thought, and experimentation.

AK-74

Early in the Soviet invasion of Afghanistan, rumors circulated about an AK-type rifle that fired a smaller .22-caliber round rather than the standard 7.62x39mm ammunition. Exactly why this would be developed is something of a mystery: the .30-caliber round and weapon had proven itself suitable in Vietnam. However, apparently just as U.S. troops in Vietnam had looked longingly at the AK-47 and its 7.62x39mm ammunition with its excellent tracer and lack of a problem with water sticking in the bore, so did the Soviets covet the flat trajectory, light weight, and low recoil of the 5.56x45mm round.

The Soviets designed their new round and the old one to minimize development time and costs. Although the 5.45x39mm is not exactly a 7.62x39mm necked down, it is close enough that much of the equipment used by the Soviets could be used for that caliber also.

The rifle was the same, except that the distinctive curve encountered with the AK-47 magazine is absent because the angle of the cartridges permitted the magazine to be straighter. Controls are otherwise identical, as are sights. As a consequence, the AK-74 suffers from the same deficiencies in these areas as does its larger-caliber brother.

The new rifles are equipped with a muzzle brake, which makes the rifles more controllable in full-auto fire (although no shoulder-fired weapon is really very effective when used in that fashion). The muzzle brake seems to blow part of the blast backward, so the noise level is quite high.

Although the AK-74 was developed at a time when night sights were coming on line, they are absent on the AK-74. This is an unfortunate omission. The sights are no better than those found on the AK-47 series, and one wonders why the peep sights of the M60/62 Finnish version were not incorporated into

This group was fired at 25 meters with the AK-74 on full-auto mode in two- to three-shot bursts with the Soviet AK-74.

the new design. I would prefer the peep to any open sights.

The AK-74, like the AK-47, comes in both the fixed-stock and folding-stock model. The fixed stock is always preferable when serious shooting is to be done, and the models are similar as far as the fixed stock is concerned. The folder, on the other hand, is much better on the AK-74. On the AK-47, the folder is basically copied from a German MP-38 SMG. It has a double strut and a single locking place. On both weapons, it will become wobbly where the locking point is worn. On the low-recoil 9mm SMG, it is not troublesome, but on the more powerful 7.62x39mm rifle, it does greatly affect accuracy. This is especially noteworthy because the SMG is basically a 150-meter weapon, whereas the AK-47 is a rifle, which means we expect more of it in terms of range and accuracy. Similarly, the struts on the 9mm that hit the cheek with low impact strike much harder on the 7.62x39mm version. Although still not enough to seriously injure a cheek, these strikes do hurt, and no one shoots his best

under such circumstances. The shape of the buttplate is also not optimal to accept rifle recoil and, with a magazine in the weapon, very little clearance is available on the AK-47 folder. On the MP-38 SMG, it folds before the magazine, thereby avoiding the problem.

On the AK-74, the folder is a much stronger design with less potential for wobble, and the strut is much gentler on the cheek. All told, it is a clear improvement over the design found on the AK-47 folder.

Whether the AK-74 rifle represents a real improvement or not over the AK-47 is not settled, at least in my mind. Other than the lower power of the .22-caliber AK-74 and the problem of water collecting in the chamber barrel and lower receiver, the AK-74 is certainly no worse when carried in rainy climates or on waterborne operations, and may even have a couple of potential improvements, especially on the folder. The water problem can be overcome with a muzzle cap, although I have never seen one on an AK-74 (they are common on M16-type rifles as well as other 5.56mm Western weapons). Perhaps the Soviets have them available or would have if they had done a lot of operations in wet areas. That leaves the issue of caliber. The trajectory of the 5.45x39mm is certainly lower than that of the 7.62x39mm, but if you accept the fact that infantry rifles are meant to be used within 300 meters, then it becomes a nonissue. I for one would prefer my 7.62x39mm loaded with API (armor-piercing incendiary) ammunition over a 5.45x39mm rifle.

The AK-74 would have been better had the designers incorporated the Galil-type safety and sight system and included radioactive night sights.

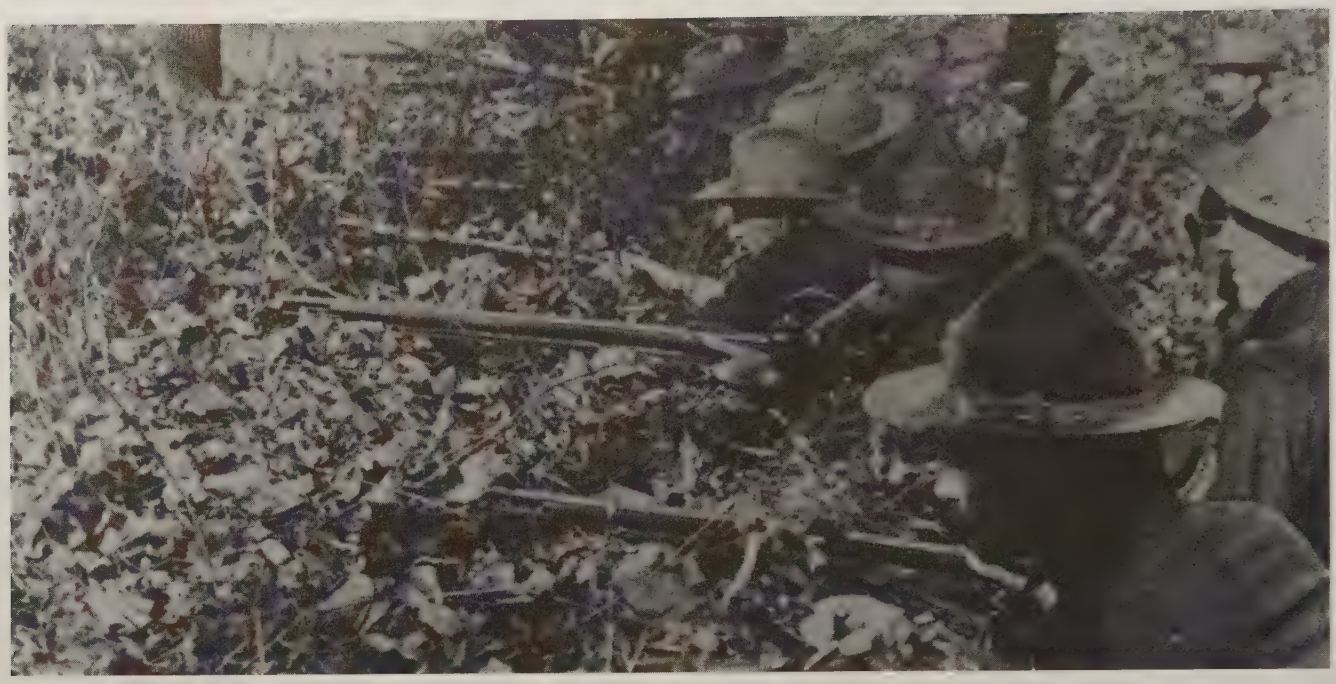
M1873 SPRINGFIELD

I am including this weapon in this test series mainly because of its use in the Spanish-American War of 1898 and subsequent campaigns in the U.S. Pacific empire. It also interests me that this is a weapon (at least in carbine format) that is frequently encountered in the hunting field. Also, I find it quite charming that a cartridge that came to light more than 120 years ago is just as useful today as it was then. One wonders whether an M16A2 or AK-74 will be still found in the fields in 2115. Guns do last a long time if properly cared for!

During the Indian campaigns the M1873 Springfield rifles and carbines used black-powder loads, producing no difficulties. But in the Spanish-American War in Cuba and Puerto Rico, it became apparent that such loads put the soldier at a severe disadvantage, and special smokeless loads were developed. Recently, I had an opportunity to read some articles from an 1898 issue of *Shooting and Fishing* magazine, which pointed out how the soldiers felt as well armed with smokeless loads as they did with the Krag, but that using black-powder loads was viewed as inviting death. The single-shot M1873 certainly had proven itself rugged, and it had sufficient power to disable an attacker. Accuracy was likewise quite good as a result of years of developing loads and sights.

The M1873 Springfield rifle was designed to be used by foot troops and the carbine to be used by cavalrymen. The carbine shot a load of a 405-grain bullet and 55 grains of powder versus the 500-grain bullet backed by 70 grains of black powder used in the rifle. From what I can tell in my readings from contemporary sources, it appears that most people who were serious shooters viewed the rifle as far more accurate and generally superior to the carbine. I have always preferred the carbine because it is lighter, handier, and better balanced. But then I like short weapons.

The front sight on both examples is a large, fairly thin piece of metal, and I find both difficult to see in anything other than excellent light. A small dab of white paint improves the sight picture tremendously. The rear sight is a very involved unit that allows the shooter to use the rifle at greatly extended ranges. I rather doubt that anyone ever used M1873 Springfield sights at the longer settings, other than on the target range, although it is possible that out on the American prairies they were used. Similar long-range sights were on Remington Rolling Blocks. I recall reading an article dating from the Russian-Turkish War of 1876 describing how the soldiers used the long-range sights and high trajectory of the cartridges to shoot over the walls of a fort and rain bullets on the enemy hiding there; the soldiers were firing the rifles much as we today would use a mortar.



The 20th Kansas Volunteer Infantry armed with the Springfield .45-70 Govt. rifle in the Philippines in 1899.

Both rifle and carbine lack a top handguard, which is not so critical on a single-shot rifle, but if the shooter is trained and has the ammunition laid out, it is no trick to fire the rifle so fast that it becomes hot enough to burn one's hand. Firing 12 rounds a minute is not any real test if the ammunition is to hand and the shooter is in a foxhole-supported position. Obviously, this is slower than can be gotten with a clip-fed bolt action (I have gotten up to 25 rounds per minute with an M700 Remington—all hits at 300 yards on a chest-sized plate), but anyone hit solidly with a .45-70 Govt. is unlikely to need two applications.

The stocks on both weapons are made of good, solid wood and have thick wrists, in keeping with the general lack of repair facilities on the frontier at the time. The rifle has a cleaning rod slung under the barrel, and the carbine carries a jointed rod in the buttstock. I use cleaning rods that go with the weapon more to push out jammed empties rather than for actual cleaning, but they can be used to clean as well. I think that I have had to push stuck cases out of the barrels of every military rifle I have ever shot more than 3,000 rounds through.

The front sight on the M1873 Springfield carbine is very small and difficult to see. Compare this with the excellent sights found on French military rifles of the same period.

Both rifles bear solid, smooth-finished buttplates, which are obviously better for really rough going even if they result in greater felt recoil than rubber pads.

The main distinguishing characteristic of the M1873 is the action. To load, cock the

After cocking the hammer, vigorously push the gate latch with your thumb forward and extract the case until it flips out, allowing loading from the cartridge belt. Note the cartridge gate has not hit the top of the barrel in this photo, where it will ultimately come to rest.

hammer to the half-cocked position and flip the catch, and the action will open much as a door will. Throw a fresh cartridge into the chamber, slam the action closed, finish cocking the hammer if you wish to fire a shot immediately, and pull the trigger to fire. The whole operation can be completed in four seconds if you practice and the weather is good. Cold hands and gloves will greatly increase the time. The trigger pull is heavy, and the hammer falls long and hard. The recoil is heavier than what the modern soldier has come to expect, and, naturally, if black powder is used, there is a big ball of smoke each time the weapon is fired. The trigger pull seems heavy in comparison to a sporting rifle, but it seems about the same as the H&K G3 trigger action.

There is no doubt that anyone using an M1873 today is outclassed by an enemy armed with modern infantry weapons. U.S. infantrymen realized that fact in 1898 when they came up against Mauser-armed Spanish soldiers. Although I would be just as happy with an Enfield No.1 MK III as with an H&K G3, I must say that rifles really did develop between 1873 and 1898 much more than they did between 1914 and 1994 so far as practical, usable weapons are concerned. Thus, I would not be happy with an M1873 when I could get my hands on an M93, M95, or M98 Mauser.

REMINGTON LEE M1879/82

Oddly enough, at the end of the 19th century the U.S. Navy seemed to be in the forefront of small-arms weapons development. Perhaps this was because of the small number of weapons needed for its limited landing parties or perhaps some particularly hard-charging, small-arms enthusiast at the Navy Department at the time. I would imagine a little of both.

The 6mm Lee rifle was way ahead of the rifles used by the U.S. Army at the time, and the caliber may well be superior to what it is using even today. But even more remarkable was the adoption of the Lee 1879/82 rifle. This rifle was a .45-70 bolt action that fed from rapidly detachable (and inexpensive)

magazines. In a day when army troops had single-shot Springfields and before the release of smokeless powder in France in 1886, this five-shot, bolt-action rifle was a great stride forward.

The test example looked quite like a typical Springfield and was roughly the same length. It lacked cleaning equipment in the butt but did have a cleaning rod slung under the barrel.

The author firing the M1879/82 Lee .45-70 rifle.

The upper barrel is partially covered with a handguard and partially exposed. Because of the small number of rounds fired and the use of black powder, I doubt that the barrel gets excessively hot. The front sight is dark and hard to see, and the rear sight is an open type, unprotected by wings yet difficult to use because of its shape. Although it contained a lot of adjustments for distance, the sight is not easily adjustable for windage. With the high trajectory of the .45-70 cartridge and the sights on the rifle, it could be used effectively for an indirect-fire weapon and also substitute for a machine gun by volley firing in certain circumstances.

The rifle contains no safety except for the large cocking piece at the rear, which can be carefully lowered with the thumb. Whether a sharp blow to the cocking piece would fire the weapon or not, I do not know—Leroy Thompson, who owns the rifle, would not allow me to hit his collector's prize with a rock. I would be surprised if it would not fire. I would also be surprised to learn that many accidental firings had not taken place when slippery thumbs allowed the cocking piece to slam forward. I am not fully opposed to rifles without safeties, relying as I often do on merely leaving the bolt open, but I do think rifles that encourage people to lower hammers or firing pins onto live rounds pose some danger that could be avoided. Still, people have lowered their hammers on M73/76/86/92/94 Winchester rifles for more than 100 years with few mishaps, so perhaps it is not as bad a problem as I think—especially when the firing pin has such a large projection on it as the one on the Lee M1879/82.

The magazine is a single column, and no stripper clip guides are provided. You would need to remove the magazine to load it—I imagine sailors carried spare magazines when possible to maintain continuity of fire. If they did not, they should have.

The Lee M1879/82 does not have the typical two-stage military trigger that many have come to expect with military rifles, but rather a one-stage, rather crisp trigger that makes shooting it easier than otherwise would be the case, but this also means that the shooter must take care not to fire prematurely.

Interestingly enough, in addition to the

The author tests the M96 U.S. Krag at 200 yards off-hand. Note that the rear sight is in the up position.

approximately 300 rifles bought by the U.S. Navy, the weapon was also sold to Spain, Argentina, and China, thereby giving those countries a rifle that was quite advanced for its day. With the arrival of smokeless powder and stripper-clip loading, this rifle quickly became old-fashioned, although I am certain that some Springfield M1873/84-armed troopers in Cuba in 1898 would have loved it.

KRAG M96

When the U.S. Army decided to select a new magazine feed rifle, after watching first the French and then the rest of Europe abandon black-powder and large-bore rifles in the mid- to late-1880s and early 1890s, it adopted the Krag action. At that time, it was thought that infantry soldiers should have a long-barreled rifle and cavalry troopers a shorter carbine. Thus, the Krag was the last rifle adopted by the U.S. military that came in two barrel lengths. By 1903, the U.S. military had realized that it could split the difference at 24 inches and do away with this dual rifle issue. But those of us who like Krags are fortunate that the military did not know that in 1896. For there has never been a finer military surplus sporter (except possibly the M95 Spanish carbine or No. 5 Enfield) than the M96 carbine.

The front sight on the Krag has a slot with a pinned blade in front. It is not protected by heavy wings, as would become common later, and this no doubt caused many a sight to get knocked out of alignment as a soldier dropped his weapon or it fell from his hands. Front sights should have wings. The rear sight is a rather complicated tangent unit. The open part of the blade is so small that I find it difficult to use well, and the peep portion is located so far forward on the rifle that it is virtually worthless. However, it is only fair to note that many who are more familiar with such units can use them well. I prefer the Lyman peep unit that was commonly available back when people still remodeled Krags into sporters (I came along just about the time when people stopped doing it any more, rather like today with M1917 Enfields and M1903 Springfields). I can usually shoot a group one-half to one-third in size with the Lyman rear. Probably the top-ejection system was the main thing people who customize Krags did not like because it made it difficult to scope. Of course, this was before forward eye-relief scopes came along, and Jeff Cooper promoted his "Scout rifle" concept. I have always thought an M96 carbine would make a dandy "Colonel Cooper Scout." Because the Krag

ejects out the top (it feeds from the side and bottom), scoping it is difficult. The answer is a long eye-relief scope. The Krag has a slick action and a cartridge that is actually better than a .308 (because it can take a 220-grain bullet) and has less recoil.

The loading gate of the M1896 is open and ready to accept cartridges. This one-at-a-time system allows the action to be closed ready to fire, which makes the Krag an excellent hunting rifle but a poor military one.

The Krag action has only a single-locking lug. This means you must not use ammunition that fires at the .30-06 level of pressure. But there are a lot of good cartridges that do not get to that level, such as the .30-40 Krag and 6.5x55mm, both of which have been widely used in Krags. Just do not get too carried away with your loads; remember any U.S. Krag you are using is at least 91 years old. You or I should do so well when we are 91!

The bolt handle is conveniently shaped and set at the proper angle. It is also smooth finished, which is much better for rapid work than the checkered handles seen on some custom and factory sporters that were obviously put there by people who do not understand how bolt-action rifles are actually used. The Krag uses a big box on the side. To load, you open the box, place the rounds in one at a time, and then close the box. Many people think the lack of stripper clips is a serious deficiency, and it was for a military rifle—as the U.S. Army learned when its troops confronted Mauser-armed Spaniards in Cuba who fed their rifles with stripper-clipped 7x57mm ammunition. The real benefit to this method (and something ignored by most) is that it allows you to load your rifle with a round still in the chamber. For example, say you have shot three rounds and are now covering an enemy soldier. With a Krag, you can keep the weapon loaded and ready to go yet reload by flipping the box out and dumping in three rounds and you are topped up to fire again. With a Springfield, an Enfield, or (worse) an M1 Garand, you have to open the weapons, take the live round out (or entire remaining clip in the case of the M1 Garand), and then reload. Heaven help you if you are jumped while all of this is going on.

Some people also object to the bulky box on the side and claim that the weapon is difficult to carry. If you carry a rifle as you should in a combat area—with your hand on the pistol grip area—the latter point is not a problem. As to the weapon's bulkiness, it is a matter of taste. I am willing to accept the bulkiness to get the benefit of the Krag.

What you get (and why shooters still like Krags even though they are all more than 90 years old if made in the United States) is the slickness of the action. No rifle, bar none, has an action as slick as the Krag's. The best custom gun that has been carefully lapped and fitted will get such comments as, "It is as good as a Krag . . ." Because it is so good, the Krag action has become the standard against how actions work. Working a Krag action is

A U.S. cavalry trooper fires the M1896 Krag carbine from behind his horse.

like being in a real dream. If you have never tried it, do so and you will want one. They are rather like good Colt Python actions. If you get a real good action job on your Colt Python, you will not want anything else, and you will get spoiled. I specifically do not shoot Pythons for that reason: I will be spoiled for all my Smith and Wesson revolvers, much less double-action autoloaders.

Moving on from this action issue, the Krag buttplate is metal and contains a trapdoor. The stock is solid, well-made wood with a wrist area thick enough to make it rare to find a broken one. This was very important when soldiers rode horses. The stock is not meant to be removed for cleaning, and when you take them out of the stock many Krags will have rust and pitting in the area covered by the wood. The carbines are half-stocked but do have an upper forearm so you will not burn your hand on the rifle if you pick it up there as you run forward. The rifle stock goes out to the last few inches of the barrel. The barrel band also acts as the bayonet-attachment point. In contrast, the carbine does not take a bayonet, but it does have a saddle ring that rattles every time you take a step. I suggest wrapping some fishing line or rawhide thongs around it so it will not rattle. The trigger is a typical two-stage military pull and never is very light. I understand that match or target triggers were made to fit Norwegian Krags, but I have never seen one. Practice seems to be the best solution to the trigger problem—and practice is always a good solution.

The safety is a wing type that is located on the rear of the bolt. Although it seems as though it would work fine, it is slow to remove. I will use a safety that I can apply and disengage promptly, but if it is slow to put on and take off, I prefer simply to keep the bolt slightly open and then close it when I am ready to fire rather than depend on the safety.

Many of the things that make the Krag a less-than-perfect military rifle make it a fine sporter. With a sporting rifle, the Native American saying of "one shot, meat; two shots, maybe; three shots, no hits" seems accurate. In the days when people sporterized Krags, they used to grind the box off and install a flat plate. Sometimes, they would cover it all up with wood. Doing this reduced the capacity to two cartridges in the magazine plus one in the chamber, which is more than adequate. The caliber has a light recoil and fires a very effective cartridge even on very large game because of bullet penetration. The action is already as slick as desired. Assuming you have the trigger pull under control, you end up with a very hardy, well-balanced

sporter. Even today, I can think of nothing I would rather fire than a forward eye-relief scope mounted onto a Krag carbine—like sporter converted to three-shot capacity.

M95 WINCHESTER

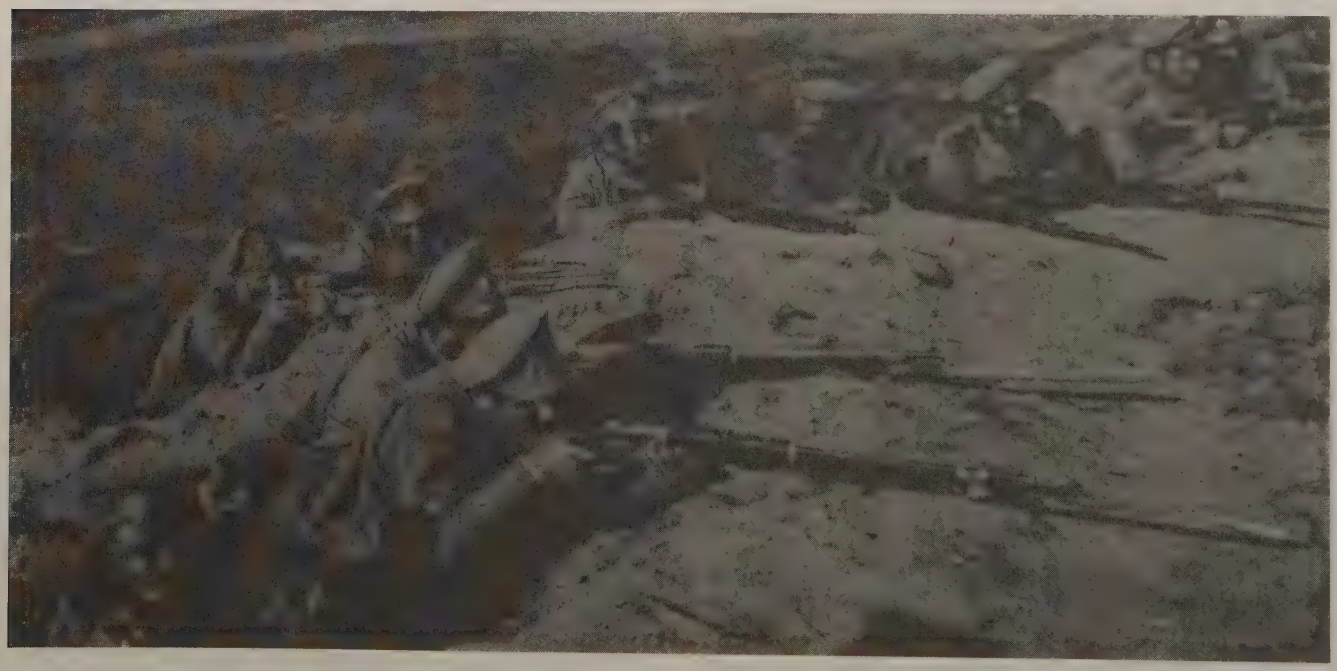
Many people do not realize that the M95 Winchester is a military arm. This is an error: we know that at least one M95 .30-40 Krag was used in Cuba because Theodore Roosevelt gave one to a member of his unit, "the Rough Riders," and, of course, Winchester sold more than 320,000 to the Imperial Russian Army prior to the 1917 Revolution. These later examples were chambered for the 7.62x54R cartridge.

People tend to either love the way an M95 looks or hate it. I find them rather appealing: they look massive and strong, much like a locomotive. They are also chambered for some quite excellent cartridges. And, of course, Theodore Roosevelt shot his lion, as well as other African game, with his M95, and proclaimed it to be a fine piece. That is always a good recommendation.

Testing the M95 proved to be a disappointment, however. The first thing I noted was how careful you need to be when loading the magazine. You cannot simply cram the ammo in with your thumb and then close the bolt and expect it to work, as with an M98 Mauser or similar rifle. The M95 uses a single-column fixed system, which will not work if you cram ammo in with your thumb. The Russian M95 uses a bridge on the top of the receiver, and when used with stripper clips, you could load it that way. Perhaps that solves the problem, but I was unable to test that feature.

The next disappointment I found was the sights. I simply cannot see them. They are far too small and dark. The rear sight also is too small to be quickly and easily used. The sights reflected the rather naive notion about how far a human eye can use open sights effectively, but perhaps if the rifles were being used as volley guns in an indirect-fire mission, it would make better sense.

I expected the trigger to be very poor because of the way it was connected and moved when you cocked the lever, but actually the trigger is acceptable. The trigger guard is somewhat small for gloved hands, and the



Imperial Russian Army troops before 1917 use M95 Winchester muskets.

The author tests an M95 Winchester carbine that has been fitted with peep sights.

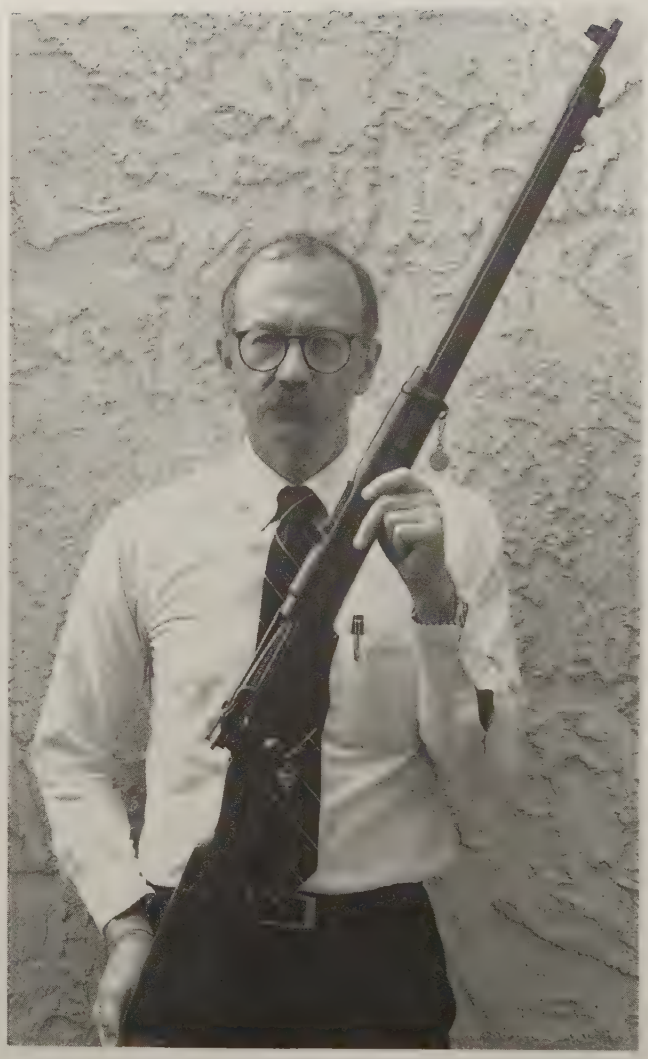
This left-side view of the M95 Winchester carbine shows the saddle ring, illustrating that many of the troopers who carried this rifle did so on horseback.

checkering on the hammer used to cock the rifles is also small. I would imagine that many Russian soldiers issued the M95 had reason to curse those two points. I realize that oversized trigger guards look odd, but when you consider that much military activity takes place in adverse weather, an oversized trigger guard would come in handy. The stock is pitched low for my face, and I have to lift my hand to use the sights. This is not a good point. The buttplate is metal and has a trapdoor inside which to store cleaning supplies or a

rod. The wrist area is strong because of the metal straps along that point. The forearm covers the wood all the way out to the last several inches at the barrel on the Russian model. Then there is a metal cap that permits a bayonet to be fixed. The carbine is only half-stocked, but some carbines have a top forearm to prevent the shooter from burning his hand. Because his barrel is so light, about 30 rounds fired fairly fast is enough to get the barrel too hot to touch. The rifle is not designed to be removed from the stock for a full cleaning. No doubt a few trips and falls on the beach will cause the saltwater and sand to get under the wood and damage the rifle.

The M95 has no safety, except a half-cock notch on the very obvious and large hammer. That is a fine system—except I would imagine that many were the Russian soldiers who accidentally fired their M95s when attempting to lower the hammer on a closed action with a round in the chamber. Cold-numbed hands will do just such a thing.

I always wondered what happened to all of those M95s made for Russia. In the 1920s, a number of them were seen in *American Rifleman* articles. Then in the late 1950s and early 1960s, they were again featured in gun magazines. I always figured they were captured guns from the Russo-Finnish War. Perhaps with the opening of the old Soviet Union, another new stock of M95 Winchester muskets in 7.62x54R will be found.



The 6mm Lee M1896 was an advanced rifle for its day.

M1896 LEE 6MM

The last decade and a half at the end of the 19th century were amazing times for military small-arms ordnance experts. The development of smokeless powder sent a jolt through the militaries of the world, rivaled only by the arrival of self-contained cartridges a couple of decades earlier. Almost overnight, the large-bore military rifle firing a large load of black powder with its huge smoke cloud, high trajectory, and lower pressure was obsolete. Soon only third-class levies or countries would use such weapons.

France led the pack with its M1886 8mm, which turned out to be a mixed blessing as France ended up with a rifle system and cartridge that were not as well suited for the future as the other European countries that followed it had. The Italians had their 6.5mm in 1891, the Russians their 7.62mm in 1891, the Swedes their 6.5 in 1894, the British their .303, the Belgians their 7.65mm, and the Germans their 8mm—all earlier than the United States. However, the United States' experience in the Spanish-American War soon revealed the superiority of the clip-fed, smokeless powder

rifle over a single-shot, black-powder arm.

Oddly enough, the smallest bore of the newly developed U.S. rifle was the 6mm Lee (.236) adopted by the U.S. Navy, of all outfits. The U.S. Navy was never known as an organization with advanced designs for individual weapons, nor did it do much real fighting at the time. Yet it picked what must be viewed as a radical design: the M1896 Lee straight-pull in the 6mm caliber.

The 6mm Lee might well be viewed as a low-end .243 Winchester load, and it is unfortunate that it was not a rimless case head because it would have been more useful for clip-fed weapons. Similarly, the powders available at the time and the quality of the steel were such that the bores of the 6mm Lee rifles quickly became worn, which represented a real drawback to the weapon.

Despite the fact that the U.S. Navy purchased some 15,000 rifles (according to published sources) and that Winchester made both civilian versions of the military model and sporters based on the action of the 6mm, Lee rifles are far from common. Thanks to the help of Martin Floyd, I was given access to a U.S. Navy example that was in near-mint condition. The first thing you notice is that despite the fairly long barrel that itself has a small bore, the weapon balances nicely and is only slightly muzzle heavy, no doubt because the barrel is thin. The weapon is fitted with a butt trap for cleaning.

The front sight has a good protective hood that is wide enough that the shooter does not confuse the side of the hood with the blade and high enough to avoid similar confusion with the top of the blade front sight. The use of the blade front sight rather than pyramid style is a nice feature and allows the eye to pick up the sight earlier. The rear sight has a small U-notch, and although it was acceptable on the brightly lit July day when I tried it out, but I fear that under worse conditions it would be much harder to use, especially with speed. The sight is graduated to 2,000 yards, and the weapon supposedly has a 700-yard, dead-aim feature—meaning that up to 700 yards, you could hold on a man with the sights set on the lowest battle setting and not be low. I imagine this is correct but could not verify it.

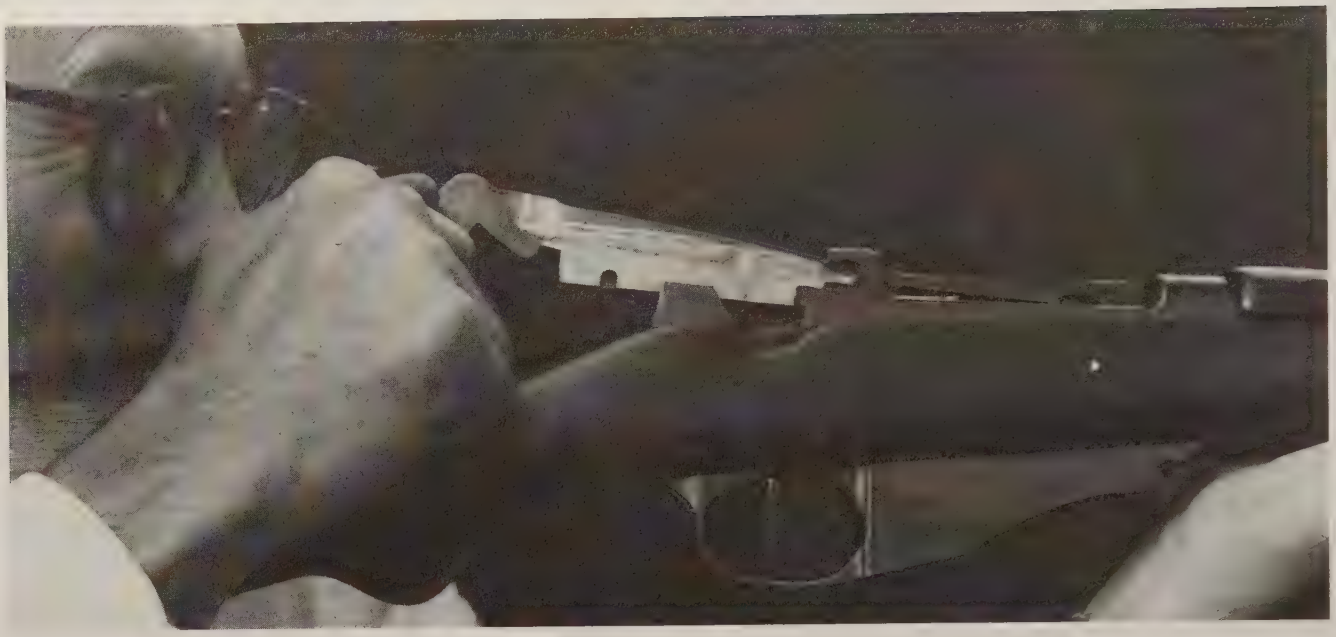
The key to the M1896 is its straight-pull action. Although many condemn such actions, you will recall that the Swiss used their M89 and successor rifles with no problems, and the Austrians found that their M95 straight-pull rifles also did fine work. Certainly, the Lee was very quick in my hands. I have discovered that I like straight-pull rifles, and I rather fancy the 6mm Lee. In 1896, I would have really liked it. I can see myself in 1897, reading of its adoption in my *Shooting and Fishing Magazine* and immediately ordering one of the civilian muskets and a couple of cases of ammunition from Winchester to try out. I would have been well satisfied, I believe, with my purchase.

An interesting feature of the rifle is that once cocked, the weapon's bolt cannot be retracted unless the bolt-release lever is pushed down. I suppose this feature would be helpful in avoiding inadvertent opening caused by bumping the bolt handle. The safety is located on the top of the receiver, and, with practice, it is possible to disengage the safety rapidly and finish taking up the firing grip all in one smooth motion. Certainly, it is faster than a Mauser wing safety.

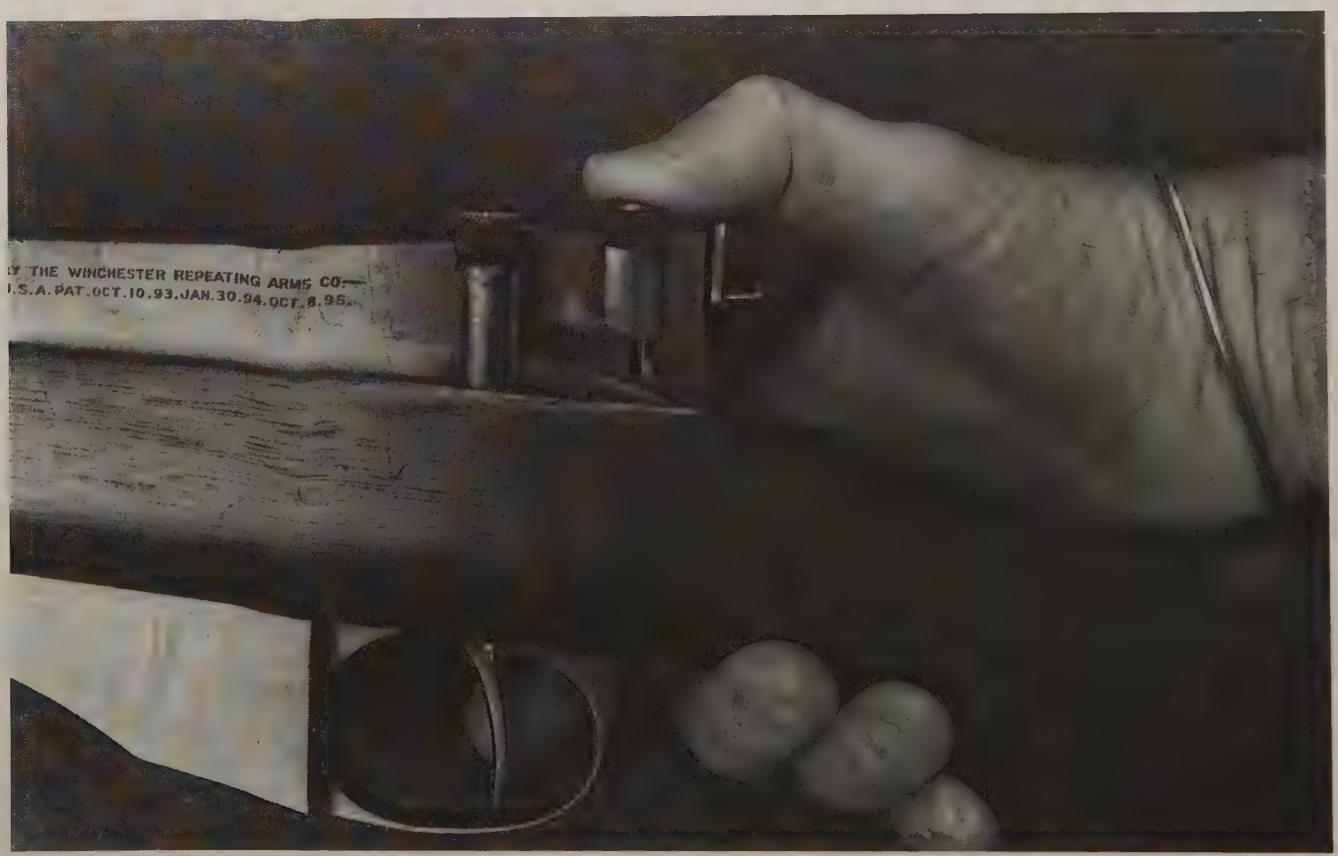
The M1896 Lee was an advanced rifle in its day and one that served its users well. The coming of the Spanish-American War and the subsequent replacement of the Krag with the M1903 Springfield spelled the end to this advanced combat rifle. It is a shame that it happened that way, because developments in powder and barrel making would have likely solved the erosion problem, and had that occurred, a rifle with greater speed of fire, a quicker safety, and less recoil than a .30-caliber Springfield might well have been used by U.S. forces for the next 50 years instead of what they got.

M1903 SPRINGFIELD

Many people truly love the M1903



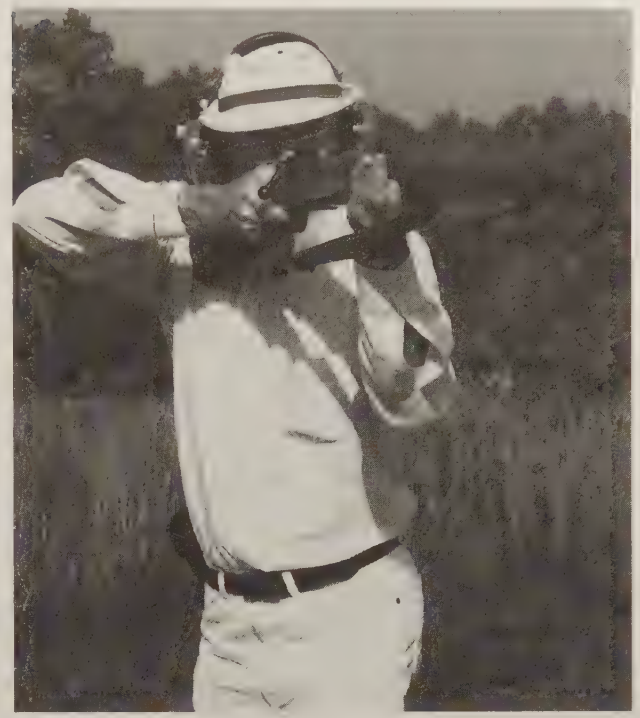
The bolt on the 6mm Lee can be worked very quickly.



To remove the safety on the 6mm Lee, use the thumb to push down the safety to the off position.

Springfield rifle, but I must say that I am not one of them. I have always thought that the main reason people liked the rifle is that it had sights that could be adjusted in very small increments for the target shooters and that it was the first bolt-action rifle widely available to sportsmen. They bought the rifles through the NRA; had them modified into beautiful sporters by Sedley, Griffin Howe, and others; and enjoyed many fine days in the field with their rifles. Consequently, their memories of the M1903 are fond ones.

Springfield M1903s come in a variety of models from the pre-World War I low-number models, which are prone to blowing up because of improper heat treatment, through the 1930s-vintage National Match guns, to the last World War II rush-production Remington-made 1903A4 with stamped parts and a two-groove barrel. Despite the variety, they all have certain features.



The author shoots the M1903A4 Springfield rifle, a wartime rush production.

This is a rare photo of a World War I-era U.S. sniper wearing a ghillie suit and carrying the M1903 Springfield.

The bolt-action is perhaps not as well designed as the M98 from which it was copied, but it is still perfectly acceptable. The stocks are all made out of wood and cover the entire barrel area, except for a very few inches at the front. The buttplate includes a trap to store cleaning equipment. The trigger is a two-pull military trigger and in the National Match models can be quite smooth, although never terribly light because it was designed to meet military specifications. The front sight on the M1903 is quite small and thin. This allows accurate shooting on target bull's-eyes at extended ranges but makes it difficult to shoot the weapon accurately in the field, where targets do not offer such a nice contrast. There is an adequate hood to cover the front sight to prevent damage.

There is a magazine cutoff that allows the shooter to use the rifle as a single loader while reserving the five rounds in the magazine for an emergency. This represents rather fuzzy

thinking in my mind, but the British had it at the turn of the century also. Perhaps the military envisioned shooting at a man-target and holding the final five for a sudden charge. I have always thought that any shooting at humans was something of an emergency and that inserting loose rounds that had been laid out in the dirt is a bad idea. And if you are carrying them in your belt, why not just use the stripper clips of five to recharge the extra magazine? Perhaps, the cutoff seemed like a better idea in 1903.

The safety on the M1903 is certain enough but very slow to disengage or engage. I am not a big believer in safeties on bolt-action guns anyway, preferring to leave the bolt handle up and throwing it closed as I take up my shooting position. I have managed to do that while adopting the kneeling position and shooting a deer at 135 yards with an M700 Remington, and I do not think it to is any slower than removing an awkward safety. With the exception of the M1914/17 Enfield and Japanese Type 38/97 rifles, I find most bolt-action safeties to be awkward and slow.

The real problem with the Springfield is with the rear sight, except for the last model made that used a peep sight mounted on the rear bridge of the action. The wartime rush job, the M1903A4, had the best sights ever put on an M1903 in my book. The standard sights are much too difficult to see. The peep portion of the sight is so far forward that it is virtually unusable, and the open part is so fine that I spend all my time hunting for the front sight and attempting to get it in proper alignment with the rear. By the time I do that, my eyes are tired, and I am also tired so that my holding the weapon on target suffers. I do much better work with a wartime M1917 Enfield than I do with a 1930s National Match M1903.

The Springfield has a 24-inch barrel, which splits the traditional distance between a real carbine version (16 to 20 inches) and a rifle length (28 to 31 inches). Because of its shorter barrel, less meaty receiver, and other design factors, the Springfield M1903 weighs

This shooter's-eye view shows the excellent rear peep sight fitted to the M1903A4 rifle. By the time it was making the last rifles (and they were not going to be really used by U.S. troops in combat), the manufacturer installed a practical rear sight on this rifle.

less than an M1917. Accordingly, the blast is greater to the shooter and the recoil is higher than that encountered with the M1917.

I really tried to learn to appreciate the M1903, even going so far as to buy a 1930s mint-condition National Match gun. I simply could not use the sights effectively. Because the weapon is a rare collector's piece in excellent condition, I did not attempt to alter the sights. Had I done so, I am certain I could have done better than with the issue sights.

Given a choice as an American doughboy in 1917, I would have preferred the M1917 Enfield.

PEDERSON DEVICE

When World War I ground to a stalemate in the fields of France, and the U.S. Army was on its way to the battle, military planners sought some type of technological breakthrough to the problem. One such thing

was the Pederson Device, which was never tested in actual combat because the Germans quit the field. I suppose that is just as well, although the firearms enthusiast in me would like to know whether tactics and firearms development would have been different had it been used. For instance, would the assault rifle have been developed earlier?

For those who may not be familiar with the Pederson Device, it is a bolt system that fits in the spot normally occupied by the rifle bolt on an M1903 Springfield. This bolt is basically an action that allows the shooter to fire the .30 Pederson round (remarkably similar to the 7.65 French round developed in the 1930s for the French MAC 35 A and B pistols and MAS 38 SMG) in a Springfield. It fires from a closed-bolt position but has no locking lugs; instead, it relies on the weight to hold the bolt closed until the pressure drops to a safe level. The magazine holds 40 rounds and is inserted at an odd angle, which is necessitated by of the ejection system used. Most interestingly, the magazine has no magazine release because it contains a spring-loaded latch. Insert the magazine lips in the space and push backward to load and pull back to withdraw. There are no buttons to push and is really quite quick. Whether it would hold up over time I do not know; it does not appear to be a very strong system, although it is clever and much faster than almost anything else of that nature that I have ever seen. I did not get a chance to run through the woods with my friend John Miller's prized collector's piece, but I would have liked to see what would happen when tree limbs struck the magazine. I think it would hop out of position and fall in the mud.

Because it is based on the M1903 Springfield, the Pederson Device suffers from all the problems typically found with that rifle concerning length and sights. However, because the ranges at which the weapon was likely to be used are very short, the problems are lessened. I think the biggest problem is that the military planners simply did not know how to use it because they condemned

The author holds a Springfield M1903 equipped with a Pederson Device.

it for its high trajectory at 400 yards and lack of ballistic crack, which people thought intimidated the enemy. This weapon is really more like a submachine gun than a rifle, and confusing the two presents a problem. The Pederson Device shoots a .30-caliber projectile of less than 100 grains at 1,300 fps. Thus, it is as fast as a 9x19mm but weighs less. I think of it rather as a 7.63 Mauser round, only a little less powerful. Thousands of Soviet and Chinese soldiers have proven that the open-bolt SMG firing this round can be very effective at close range, and I am certain that such a fast-firing weapon in the hands of U.S. troops likewise would have proven very effective on the Western front. You certainly could not sit back and plink at your foes but, rather, need to be aggressively close with the Pederson Device, but such a weapon gives you the volume of fire to achieve this feat frequently.

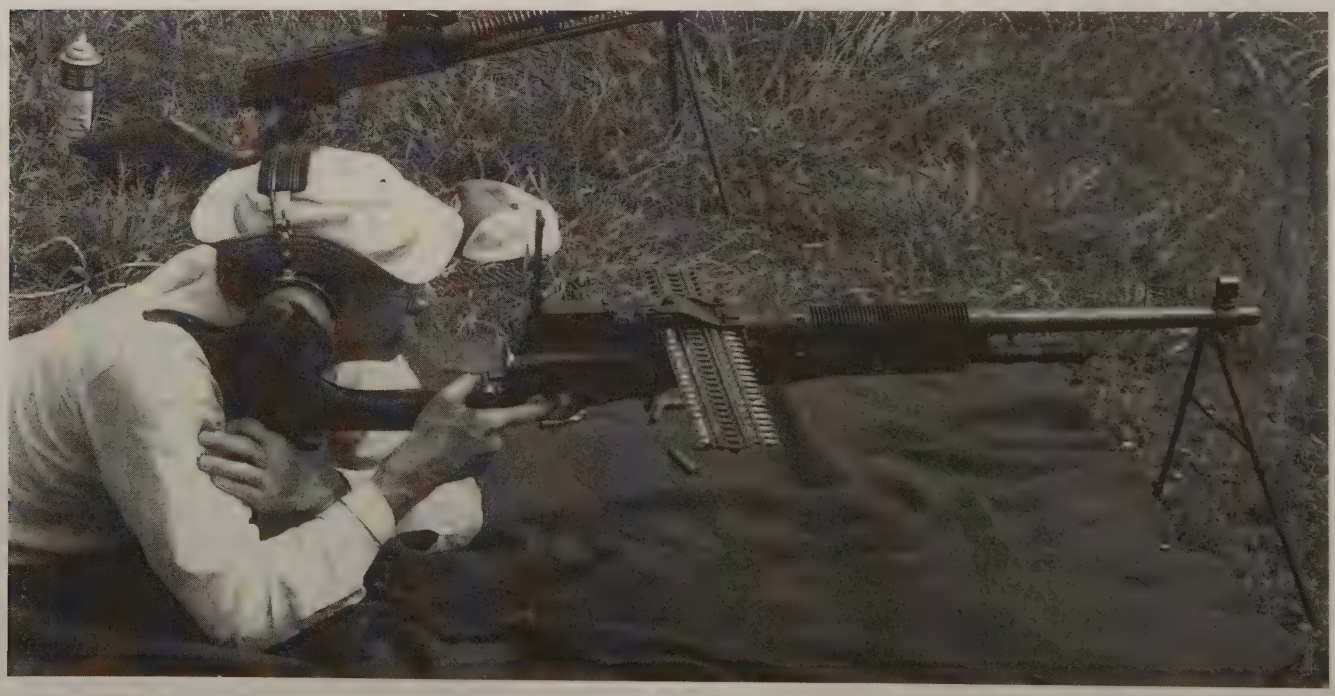
Whether the Pederson Device would have proven dependable under war conditions will never be known, I suppose. It is rather involved in the machining, and mud is always hard on anything with lots of parts. The idea

is certainly clever, the design well done, and the approach quite novel. Knowing what we know now about SMGs and stampings, perhaps a better approach would have been to make an SMG and not try to have infantrymen convert rifles in the midst of the battlefield with extra parts. I am certain that the time spent making a Pederson Device and its magazines and modifying a Springfield could easily have resulted in an SMG that did the job as well or better. Similarly, a box-fed, semiautomatic or pump-action shotgun similar to the M97 or M12 Winchester adopted, but strengthened in design and feeding from box magazines, would do the job as well as or better than a Pederson Device. Having said all that, the Pederson Device does represent an interesting technological piece of equipment, similar in many aspects to the Webley Fosberg automatic revolver, although not used as widely by any means.

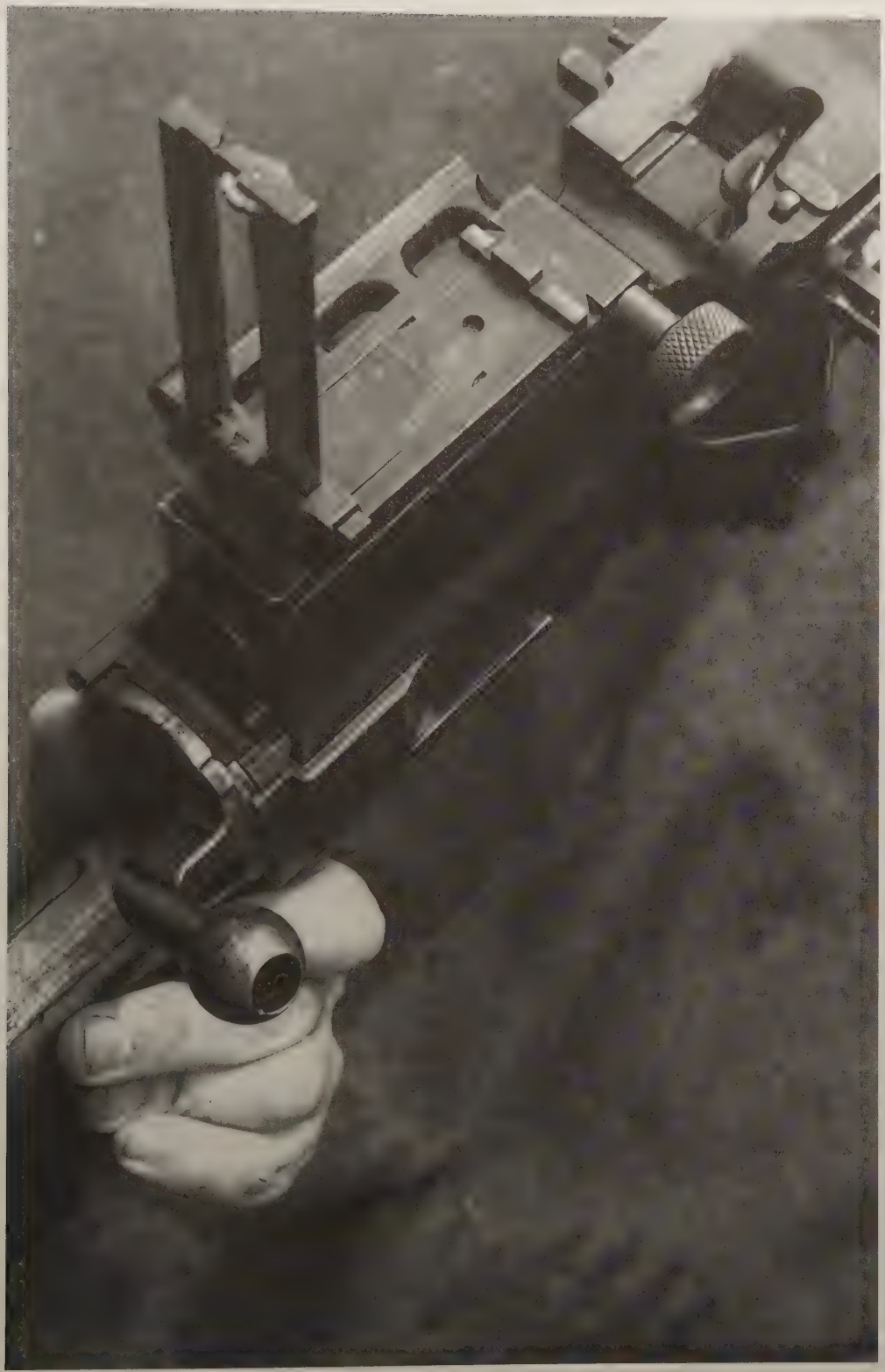
M1909 BENET-MERCIE LIGHT MACHINE GUN

I must say that my expectations of this weapon were based upon accounts of U.S. troops fighting Pancho Villa at Columbus, New Mexico, when he invaded the United States prior to our getting involved in World War I. I was pleasantly surprised that, once my shooting buddies and I figured out how it worked and the trick for loading the stripper clips, it worked like a champ. Given the fact that the example tested is more than 85 years old, I was impressed.

I also read what Julian Hatcher had to say about them, since he was very familiar with them from his experiences before World War I, and was surprised to note that he thought the M1909 was an excellent weapon if properly maintained. He blamed most of its troubles on the ill-trained troops sent to the machine gun platoon, which was a sort of



Making yourself familiar with the M1909 Benet-Mercie light machine gun and learning the trick to loading its stripper clips (which feed right to left) are the keys to its successful operation. When the stripper clip is empty, it will be ejected from the action, and a new clip can be jammed into the LMG, allowing continuous fire that is faster than magazines or even belts—provided the operators are well-trained in the intricacies of the M1909.



This top view of the M1909 Benet-Mercie shows the safety selector (just above the hand) and its quite involved and complicated rear sight unit.

dumping ground for poor troops prior to World War I. Hatcher thought the M1909 was far superior to the Lewis gun, a fact I thought quite interesting.

The stock is oddly shaped and difficult to use if you attempt to put your head down on the comb. If you hold your head up, however, you can use it and the sights quite well. The rear peep sight is very complicated, and other than as an exercise to develop the skills of machinists, it is hard to see why they were installed—except, of course, people did not know better in those days. Interestingly enough, the peep includes an open-type notch as well as peep, I suppose to allow the weapon to be used at night more easily. Like most front sights, the one of the M1909 is too dark and needs to be painted white; if coated with radium paint, the sight will glow in the dark and can be picked up rapidly.

Probably the worst feature of the

M1909 is its method of loading. Of course, this is what caused it to get such bad publicity in the Pancho Villa raid. First, the bolt must be pulled to the rear to allow the stripper clip to be inserted. Next, you must use care to make certain the clip is properly inserted because it can fit a couple of ways—but only one is correct. Interestingly enough, once properly loaded, the gun fired without any problems. Additionally, it can be reloaded quickly with extra stripper clips fed into the weapon as the old one is being finished up. In that way, you get better continuity of fire than you do with a magazine weapon that stops firing once the magazine is moved for reloading. The feed tests from one similar style of weapon showed absolutely no break in fire when new strips were continually thrown into the feeding mechanism. Of course, being able to maintain continuity of fire prevents the enemy from overrunning you. When empty, the rifle throws the stripper clips briskly to the left, and I noted that the cyclic rate of the weapon increases as the stripper clip is shot down in capacity: there is less weight on the action and, hence, less drag.

The safety is located on the end of the bolt handle, and it can be put into semiauto as well as full-auto mode. The safety is easy to work, although you do have to take your hand off the firing position to operate it. The cyclic rate is low enough so that single shots are possible even on the full-auto position, and two- and three-shot bursts are easily accomplished.

The weapon would be difficult to fire from the kneeling or off-hand position because of weight, poor balance, and, more critically, there is no place to hold with your left hand except by the folded bipod legs. The barrel, however, gets very hot by the time a strip and a half have gone though it, and it would be easy to shift the weapon in your hand and have your fingers hit the barrel. If that happens, you would instinctively withdraw your hand and the weapon would drop. The weapon is also ill balanced side to side as well as front to back because of the stripper clip with its load of ammunition shifting the weight as it is fired.

The M1909 is quite an involved mechanism and is not a very usable weapon for infantry troops to carry in the field, especially on patrol. However, I think anyone who is well trained on the weapon might find it very useful. I imagine that lack of familiarity with the weapon was the source of the problems that the soldiers at the Columbus, New Mexico, raid had with it.

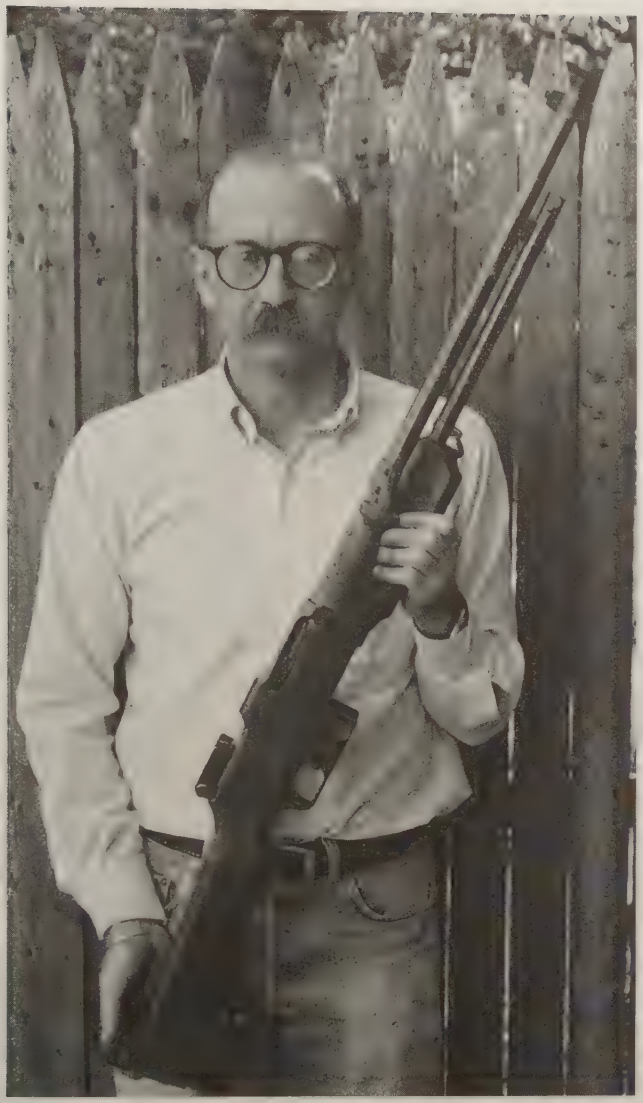
When my friend John Miller, some of his associates, and I shot the weapon, we all fumbled about with it because we were unfamiliar with it. If we had been working in the dark and were not "gun people" to begin with, we would have done worse. As it was, we got better as we learned about it, and if we had all been trained on the M1909 as well as the M60, I am certain that we would not have had any problems.

The M1909 LMG is actually much better than what we have been led to believe, and I was pleased to read that Julian Hatcher, who knew a lot more about the M1909 Benet-Mercie than I do, had come to the same conclusion.

BROWNING AUTOMATIC RIFLE M1918

The Browning Automatic Rifle (BAR) first appeared in the U.S. armory in 1918. A few units were sent to France and were fired in the last few months of World War I. The original operating theory was that the soldier would fire it from the hip and put down such a devastating wall of fire that the enemy would not be able to raise their heads from the trenches. Then the U.S. soldier would be able to point downward into the trench and finish off his German foe. Of course, it did not work out that way, but the BAR turned out to be a good weapon. It met the requirements of all true infantrymen: it was reliable, and it hit a hard blow.

The early BARs did not have bipods or (worse) monopods like the later guns and weighed 16 pounds. That was only about 7 pounds heavier than an M1903 or M1917, and



The Browning Automatic Rifle represented a great leap forward when it was introduced in 1918. Now, 80 years later, its awkward balance, limited magazine capacity, lack of belt feeding for the static role use, no rapidly detachable barrel, and poor grouping when fired in the full-auto role lead me to conclude that its day is over.

with a BAR you had the same caliber weapon, a 20-shot capacity, much faster reloading, and the capability of firing in either semiauto or full-auto mode. In a day before self-loading military-caliber rifles were common, this represented a big advance at a small price in increased weight.

The BAR fires from an open bolt and is quite long in the military format. Because of its weight, length, and open-bolt design, I find that off-hand shooting is difficult. The Colt Monitor with its 18-inch barrel that I tested is shorter and, although only marginally lighter, is much easier to handle in the off-hand position. I assume that most people came to the same conclusion and that is why the bipod was developed. But once the bipod was added, the weight increased, making off-hand work even more difficult. Gradually, the BAR became a prone position gun. Then someone got the bright idea of adding a monopod to the rear to give it greater stability, and many people mistook the BAR for an LMG. It is not an LMG: its 20-round magazine capacity is too low, and the barrel cannot be exchanged in the field. Monopods quickly get discarded in the field, but bipods stay.

Later models do not have the semiauto feature, but rather two rates of fire: the standard 650 RPM and the slower 350 RPM. Very good work can be done at the slow rate, and it is excellent for aerial targets. It is hard to see why anyone would ever want to shoot it at anything other than slow rate. In fact, slow rate coupled with semiautomatic mode would be ideal.

The BAR has always been known as a reliable gun, but it is gas operated and was designed in a day when corrosive primers were common, and that is the type of ammunition that you are most likely to be shooting in it today. Therefore, you will need to clean it well, and when doing so you must keep the butt elevated because otherwise water or cleaning solvents will leak into the action.

The sights on the BAR are quite adequate. The front sight is nicely protected and has a good-sized blade. The rear sight is also well protected and has a nice peep unit.

The barrel is not heavy, as on a machine gun, but is clearly heavier than a standard rifle. Despite this, it will heat up rapidly, and three magazines quickly through the gun are enough to cause burns to the hands of the less careful shooters. The handguard is big and

bulky but does not have any effective heat deflector, and it quickly gets hot. There is no upper handguard to protect the hand from the barrel nor any carry handle, so you must carry the BAR very much like a conventional rifle. Because of its weight, this can quickly get very tiring.

The cocking handle is nicely placed on the left side, allowing the right-handed shooter to keep his hand on the grip. The spring tension is fairly high on the BAR bolt, and care must be taken to pull it all the way back to lock it in place, lest it run forward under pressure and a round be inadvertently fired. On standard BARs, there is no separate pistol grip, although a separate pistol grip is found on the Monitor and various other post-World War I modifications.

A U.S. soldier firing the BAR on Corregidor during World War II.

Furniture is typically wood, although late-model Korean War-era guns sometimes have plastic furniture. Sling swivels are placed as if the BAR were a conventional rifle, which complicates over-the-shoulder carry.

Maintaining control in long bursts has always been somewhat marginal, except at close range, because of the weapon's light weight in contrast to the cartridge fired. U.S. soldiers in the Pacific campaigns of World War II liked the BAR because its penetration allowed them to hit Japanese soldiers who were close at hand but hidden by heavy vegetation. The Thompson's .45 ACP ammunition did not have sufficient power to penetrate the vegetation, whereas the BAR .30-06 (especially with armor-piercing ammunition) did the trick nicely. The lack of close groups was not noticed because the ranges were short. Keep the bursts short and you can do OK. When I was shooting at chest-sized metal plates at 325 yards from the prone position, the first round of the burst would hit the target and the other two would be off target but close. This is obviously the result of the recoil impulse; when I shot a BAR (the M21) made in Sweden and chambered for 6.5x55mm, the recoil impulse was much lower, and I found that it was really no trick to keep all three rounds on the same size

plate. If firepower is bullets hitting the intended target, the M21 in 6.5x55mm has more firepower than the U. S. M1918 chambered for .30-06.

With the .30-06 guns, the peep sights really are not usable after the first round is fired. The whole sight system just seems to blur. With the 6.5x55mm version, the recoil impulse is not great enough to cause blurring.

Many people are very fond of the BAR and will challenge you to a fight if you speak against it. When it was released in 1918, it certainly was an improvement over similar weapons. Remember, in those days it was the Maxim 08/15, very heavy and water cooled, feeding from a belt; the Lewis gun, heavier and using an involved drum, also expensive to maintain and build; and the French Chauchat, possibly the single worst weapon of World War I if chambered for .30-06 (although actually remarkably good in 8mm Lebel). Rifles were all five-shot repeaters by virtue of bolt action or lever action. Compared to these weapons, the M1918 Browning looks great. Now 80 years later, its awkward balance, limited magazine capacity, lack of belt feeding for static use, no rapidly detachable barrel, and poor grouping when fired in the full-auto role lead me to conclude that its day is over. But before we throw it on the dustbin, do keep in mind that Soviet planners are satisfied with their RPD and RPK weapons that have the same role as the BAR and give about the same accuracy but shoot a lesser cartridge. It is only when comparing it with the current squad automatic weapon, the M249, that the design seems extremely dated.

.50 BROWNING M2HB

This weapon defines the term heavy machine gun. Although the Soviet-designed 12.7mm and 14.5mm guns are its equal (or in terms of the 14.5mm, perhaps even ballistically superior in some ways), both of these weapons are heavier and have a much greater muzzle blast and flash than the .50-caliber Browning.

Some people who apparently never were infantrymen have said that the Browning .50 can be used by ground troops to replace the 7.62x51mm guns at the platoon or company level. Thus, the troops would have 5.56x45mm rifles, squad automatic weapons (referred to by some as LMGs, but they are not LMGs in my book no matter how well small, light bullets penetrated old-style GI helmets at 800 yards), and .50 Brownings, thereby eliminating 7.62x51mm guns and simplifying ammunition, training, and resupply problems.

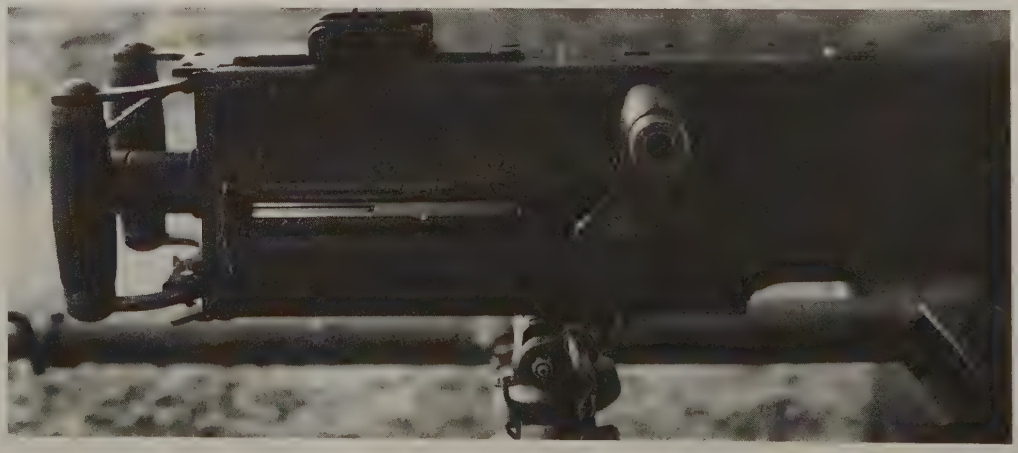
This is a fine idea—except that it is unworkable because of the weight of the weapon and ammunition. With the barrel as one unit, the receiver as another, and the tripod with pintle as a third, you can carry the weapon in the field, but it is not really foot mobile. I can carry an M60 and a box of ammunition and stagger along over broken ground an entire day. With a .50-caliber Browning, I can carry one of the three mentioned components but nothing else except a pistol. I would not be armed to contribute to a fight until joined by the two others who carry the rest of the gun. Then, of course, you have to have ammunition. A 100-round box of .50 is equal to 500 rounds of 7.62x51mm. Although the on-target performance is better for soft-skinned targets (such as people), the .50 power is lost. Mounted on vehicles where the vehicle carries the ammo and gun, a .50 Browning is a fine thing to have, but as an ex-infantryman, count me out for carrying it on foot in the field.

Ammunition for the .50 BMG is quite well developed and much cheaper than 20mm ammunition, and it is this fact that has allowed the .50 BMG to continue in inventory since the cartridge first came on line in 1921. Ball rounds are quite powerful in themselves, but when an AP round is used, you get much better results. Tracer ammunition is quite bright even in daylight, and the bullets are big enough to contain such qualities as to permit you to see the rounds a long way off. In fact,

most people adjust their fire from the tracers. Frankly, this is not an ideal solution because the tracers frequently have a slightly different POI from the ball or AP rounds. An observer is really useful when firing the machine gun at extended ranges.

Much more useful than either AP or tracer is armor-piercing incendiary tracer (APIT). This ammunition can be seen because of the tracer and has good penetration because of the steel inserts, and the incendiary material in the bullets can be seen blowing up (a bright flash is seen) at great distances as well as igniting almost anything burnable. I have seen cars catch fire that had no gas in the tanks. The incendiary matter will ignite the seat material or wiring harness. Soon the entire car is a mass of flames. At 450 yards, the impact of each round can be seen clearly as a bright flash. If you are not worried about costs of ammunition,

The .50-caliber Browning M2HB exemplifies the term machine gun. A well-operated, well-supplied .50 BMG M2HB is perfectly capable of turning the tide of a battle single-handedly.



The cocking handle on the .50-caliber Browning M2HB is like all the parts on the weapon: built to last.

excessive penetration, or burning things up, this is the ammunition to use.

Such ammunition is devastating on helicopters. A well-manned .50 BMG can chew up a helicopter within 1,000 yards. When pilots know that .50s (or 12.7/14.5mm) are in a certain vicinity, they fly higher and faster and are less prone to land on top of you.

If vehicles are your target, however, you may wish to consider some of the newly developed, superpenetrating ammunition that uses depleted uranium. Such ammunition will penetrate much more than conventional AP ammo and also will cause a fire once inside the vehicles. It can totally destroy an armored personnel carrier such as the M113.

Browning machine guns of all types are noted for their reliability, and the .50 BMG stands at the front of the class. I have seen my friend Kent Lomont take a .50 BMG M2 HB and fire continual full-belt bursts until two-thirds of the length of the barrel is glowing cherry red. Once the .50 BMGs are properly adjusted, they will fire without any serious problems. After about 250,000 rounds, the rivets will get loose, and you need to have the side plates re-riveted, which costs about $400. However, 250,000 rounds will cost $150,000 at a minimum if you buy the ammunition at the cheapest possible level—so you get the idea.

Parts on the .50 BMG break so infrequently that when I asked Kent Lomont what parts to stock as spares, he looked at me blankly, thought about it, and replied, "Maybe a firing pin." But, he quickly added, that he has never broken one and has worn out barrels in his guns. This came from a man who turns the barrels on his so red from the muzzle from long bursts and converts them into smooth-bore scrap material. It will cost you as much as $30,000 to wear out a barrel even when you get them cherry red doing it, so obviously parts breakage is not a big issue here.

The .50 BMG is not a weapon for the weak or feeble, not because of the recoil but because it is a heavy weapon to lug about. Also the tripod is heavy, and so is the ammo. Everything about the weapon is big and heavy because it is built to last. But it is also a difficult weapon to use for weak people. When you try to push a box of ammo for it (100 rounds) up over your head and through the hatch on a vehicle, you will see what I mean. The box weighs 44 pounds. Then you need to cock the weapon twice to put it in operation. It does not cock like an LMG: you must really pull it back with some vigor. I saw Kathy Lomont, a good-sized woman who shoots machine guns all the time, have trouble cocking the .50 BMG, and that was with a stand-up mount. In a foxhole where leverage is worse, many people would simply be unable to cock the weapon. But then perhaps if you cannot cock it, you do not have any business being up where they're shot.

The .50 BMG also fires quite adequately. However, unlike with the Soviet 12.7mm and 14.5mm guns, you do not have the big muzzle flash or blast in your face—although the weapon will recoil. The key to good accuracy with the .50 is to spread the tripod legs out to the maximum possible extent given the terrain involved and then to put sandbags around each leg. Four on each leg work OK, but six are better. Of course, you must dig the legs in before you lay the sandbags on the ends of the leg.

A .50 BMG M2HB well dug in and operated by people who can manage the gun and are adequately supplied with ammunition is a formidable tool. Rarely does an individual rifleman turn the tide of a battle; thus, no single rifle, submachine gun, or pistol is likely to the sole determinant of the outcome of a battle, but a well-operated .50 BMG M2HB is perfectly capable of doing so. Anyone serious about infantry operations should be knowledgeable about its capabilities and use.

M1 GARAND

During World War II, the only army in the world to have a semiautomatic rifle as a standard-issue infantry weapon was the United States with its M1 Garand. That rifle

had been adopted in 1936 after many painstaking years of testing. By the time the United States got into the war, production and issue were well under way. It was a rare U.S. unit that had anything else by 1943. Early U.S. Marine units apparently had shunned the weapon, preferring the accuracy of the M1903, but real-life use in the jungles where ranges were short soon showed them that an eight-shot semiauto was better than a five-shot bolt action.

By the time I was in the army, the M1 Garand was in very limited use. We had them in my ROTC unit, and they were standard issue to Vietnamese infantry units. For the latter role, the M1 Garand was an extremely poor choice since it is too long and heavy for the small, frail Vietnamese. The M1 or M2 Carbine or the later M16 rifle was much better. In ROTC, we only used it in training, so it really did not matter. I was familiar with the M1 Garand prior to that time, having bought a mint-condition one for $85 when I was 14.

The first thing I noticed as a 14-year-old was how much less recoil I felt with the M1 Garand than with the M1903 or M1917 Enfield. It was light enough for a 120-pound 14-year-old, so certainly it should not bother anyone else. Its problem comes from other things.

The sights on the M1 Garand are quite good. The front uses a blade protected by two heavy wings that are enough to avoid damage except in very rare circumstances. The front sight is a little thick for formal use on a long-distance range, but that is why the National Match front sight exists. The standard is good enough for combat targets out to 600 yards. The rear sight, as long as it is tight, offers an excellent peep sight with plenty of adjustments. This sight is quick to use in poor light or on moving targets. Massive wings protect it too, unless the rifle is dropped directly on the sight.

The trigger pull on the M1 Garand is very good for a semiautomatic rifle. Certainly, it is as good as the standard military bolt-action rifle, and in good examples, it is better. Compare the trigger of the M1 Garand with that of the G3 and you will soon realize why you can hit smaller targets or targets at longer ranges with the M1 Garand than you can with the G3. It is the trigger pull that permits the better work.

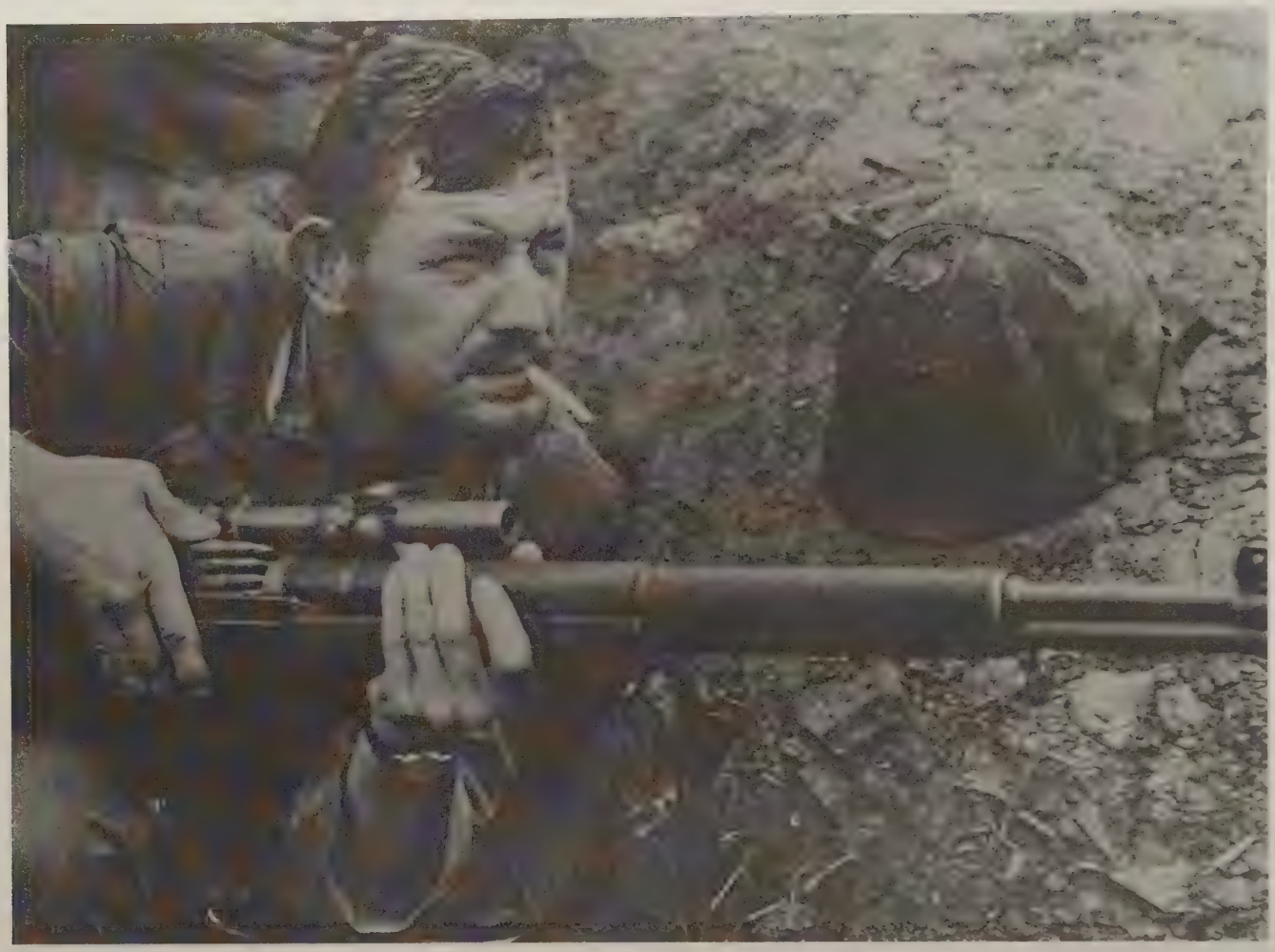
The stock has a nice shape to it and also offers a butt trap for cleaning supplies. The grip is handy to hold and allows good control. As an aside, it looks more like a "rifle" than a "machine gun" to the ill educated. The weapon can be quickly field-stripped and the stock removed to allow maintenance to the action beneath the wood without any problems. Try that with a normal bolt action, where removing the action from the stock is difficult. Improved maintenance is the result. The weapon may shift zero when you do this but rarely enough to throw you off at 300 yards on man-targets, although match rifles probably should not be removed without a complete check of the zero.

The safety on the M1 Garand is centrally located, thus allowing the shooter to quickly disengage the safety with either hand. The bolt handle is located on the right, however, which makes it more difficult to cock for the left-handed shooter. I think the trigger guard should be bigger to allow access with a gloved or mittened hand, although there is a winter trigger guard available. I doubt that anybody really ever had access to such units when they needed them. The U.S. Army is like that!

Many people have commented that the M1 Garand is free from projecting magazines and seem to think that is a good thing. Perhaps for the drill field it is, but not for the battlefield. I understand that at one point the M1 Garand was supposed to have a BAR magazine. It is certainly a shame that it was taken away. Apparently, some people thought it would be cheaper to make the little clips the M1 Garand uses and, more important, that the rifle would handle close-order drills better without a projecting magazine. In my judgment, the weakest point about the M1 Garand has always been its eight-shot capacity. But not only is its capacity limited to

The M1 Garand is still a fine rifle, despite its age. Many of the examples seen today have been knocked around for 50 years or more and still function well. But it is doomed as a battle rifle by its lack of a rapidly detachable magazine.

A World War II-era photo showing what an M1 Garand-armed paratrooper carried.



A Korean-era soldier loads his M1 Garand sniper rifle.

This top view of the M1 Garand sniper rifle shows how the scope is mounted to the side.

The offset cheekpiece fitted to the M1 Garand sniper rifle permits the shooter to get his eye to the proper level to use the scope.

eight shots, you also have to empty the weapon entirely to load it. For instance, if you encounter a situation where you fire five shots and still have a potential problem, you have to choose between shooting the last three rounds needlessly and then reloading it or facing your enemy with a nearly empty rifle. It is much better to simply pull out the partially full magazine, insert a new one with a full complement, and then get ready to go.

People who shoot the M1 Garand a lot can reload very quickly using the M1 clips, but no matter how fast they become, they still may be confronted the above dilemma at some point and be left an empty weapon in their hand. The lack of a detachable magazine is what dooms the M1 Garand.

Some people criticize the M1 Garand gas system as being too long, resulting in inaccuracy. Early examples did have some problems, but those reliability and accuracy problems were solved more years ago than most of my readers were born.

The wood stock of the M1 Garand does not have any heat shield, and if you fire it a lot of rounds quickly, it will get very hot. Rarely will it catch fire, but I have shot one fast and long enough on an already hot day to get the oil boiling out of the stock. It takes about 100 rounds in two minutes.

The sling swivels are positioned in the traditional locations for a rifle, making it difficult to carry the rifle in the so-called "assault position," and unless wrapped the front swivel will hit the wood, making a clearly identifiable noise.

Last, the M1 Garand is somewhat heavy, rather ill balanced, and long. At least it feels that way in comparison with an M1903. When you compare it with some of the rifles common today, such as a G3 or SA80, it starts to feel like a lightweight wand, so it really is a matter of degree. All of us, I am certain, have seen pictures of the so-called Tanker model with a shorter barrel. These examples are available today from Springfield Armory, and I find them much handier than the standard-length model. If the Tanker model only had a detachable magazine, it would have been much better than either the M1 Garand or M1 carbine for actual combat use in World War II.

The M1 Garand is still a fine rifle, despite

its age. Many of the examples seen today have been knocked around for 50 years or more and still function well. The caliber is powerful, and the accuracy (both from the actual inherent and practical standpoint) is quite good. It is the reloading system that would force me to choose an M1917 Enfield over the M1 Garand for a battle rifle.

M1 CARBINE—M1A1-M2

Because of the method commonly used before World War II to instruct soldiers in the use of the handgun, it was apparent to many that better work could be done with some type of rifle. At the same time that familiarity with firearms had gone down, the number of soldiers who were not truly pure warriors had increased. Such people needed something better than a handgun to protect themselves with, yet could not be burdened with a full-sized and powered rifle.

In the early 1940s with the threat of a war in Europe on the horizon, the U.S. Army adopted the M1 carbine. The choice of term was probably unfortunate because the army already used the M1 rifle, which shot the .30-06 cartridge. Carbine heretofore had always referred merely to the shortened version of a rifle, but the M1 carbine was not a shortened M1 rifle. It did not shoot the .30-06, but rather a entirely different cartridge of much less power, more akin to a .357 Magnum revolver cartridge. Naturally. the M1 carbine would be viewed as a very weak M1 Garand. Had it been called something else perhaps the inevitable comparisons that always were made to the disadvantage of the M1 carbine would have been avoided.

This is not to say that people did not like the M1 carbine. Almost anybody who has access to one likes it. As Spencer Chapman, the author of *The Jungle Is Neutral*, said of the M1 carbine, "The new Winchester .30 Carbine is a joy, short and light and very handy—ideal for the Chinese. It is semiautomatic, holds 16 rounds in the magazine, has aperture sights and a cunning safety catch you press with the trigger finger—a perfect weapon for the jungle."

The M1 carbine is indeed lightweight, easy to shoot, low in recoil, reasonably accurate, and (relatively speaking) powerful. It

Top: Early M1 carbine with fixed sight, push-button safety, 15-round magazine, and no bayonet lug. Bottom: M1A1 carbine with adjustable sights, flipper safety, and bayonet lug. This model is also fitted with compensator and 30-round magazine.

U.S. advisors and Republic of Vietnam soldiers carried M1/M2 carbines during the early stages of the Vietnam War.

looks weak when contrasted to a .30-06 but stands tall when compared with a 9x19mm submachine gun. During World War II, more M1 carbines were made than any other single service weapon. They were used all over the world and stood up well to the conditions. Even today, they soldier on in Southeast Asia and Latin America. In 1961 I bought one that had been made in 1941, and it works as well today as it did the day I brought it home on my bicycle, despite many thousands of rounds having been shot through it.

During World War II many "shooters" claimed it was worthless, but others such as Lieutenant Colonel George, who wrote *Shots Fired in Anger*, selected it as his weapon of choice for battles against the Japanese. I think it would have been my choice also, especially if loaded with tracer ammunition, because it was the only weapon-cartridge combination of its day that used noncorrosive ammunition. Maintenance in the field would certainly have been easier.

The front sight on the carbine is a nice-sized blade protected by sturdy ears. Early versions had a simple L-shaped slip sight, but it was soon replaced by a fully adjustable and quite rugged peep sight. Paint the front blade white and you could not ask for a better sight.

The bolt handle does follow the bolt back and does stick out. But because of the light spring involved and short bolt throw, it is no trick to reach over the weapon and pull it to the rear with the left hand. Early models had a push-button safety and a push-button magazine release that were located close together. Some people apparently got confused, and they would dump the magazine

when attempting to release the safety. Toward the end of the carbine's manufacture, the safety button was replaced by a switch or lever. I have always found that slower and invariably replace it with a button unit from an older weapon. Equipped with this push-button safety, it is perfectly suited for jump shooting, given its short size and good balance.

The M1 carbine and its variants use a wood stock. The sling is retained on the standard-stock version with an oiler unit, thereby keeping the oil necessary to lubricate the weapon close at hand. Unfortunately, no cleaning equipment is installed in the butt of the weapon. On the M1A1 carbine, a folding stock and a pistol grip are used. The pistol grip is nicely shaped, and, given the low recoil of the cartridge, the folding stock is acceptable. It locks into position rigidly enough to be useful, yet can be instantly swung open or closed without any button to push or parts to be pulled away, as is required on the FN-FAL or Galil. Recoil from the cartridge is light enough so that no particularly involved stock design is necessary.

A U.S. soldier in the 1950s armed with the M1 carbine.

The trigger guard has the edges rounded enough to avoid cutting. The magazine housing is not flared to allow the magazines to go in off-center, as on the AK-47, Galil, and M14 rifles, which require the magazine to be pushed out and pulled back to lock in position. On the M1 carbine, you merely push it up straight until it locks into position. If you intend to use the 30-round magazine, the M2-style magazine catch (which has an additional

M1 carbines were still supplied in the 1980s to Contras in Central America.

detent) should be used. Changing it is a matter of a few minutes' work.

The forearm of the carbine feels good in the hand. Although it has no heat deflector, the cartridge does not generate a lot of heat, as does the .308 or 7.62x39mm. I remember getting a forearm warm but never so hot as to be uncomfortable, as on an AK-47 or M14.

The barrel of the carbine does not have a flash hider or muzzle brake unless those accessories are clamped on. I have tried both at different times and honestly could not detect any real difference in either flash or recoil. They did tend to vibrate loose, however, and the compensator can cause some inaccuracy unless great care is taken in its installation.

Some people have stated that the carbines are inaccurate. That has not been my experience; I have always found them good for 3 inches at 100 yards with no problem. I can do that well with a few of my pistols on my better days. I do find that if you take them out of the stock and then put them back in, the zero may change. Similarly, if you tighten the barrel band too much, you will throw off the zero, and I suppose you could affect accuracy. Anyone who takes care to remember the turns or mark the slot location to return it to the same position should be able to avoid such difficulties, however.

The carbine also comes in common two variations: the M1A1 and M2. The M1A1 is merely the standard version inserted in a folding stock that was developed for airborne use in World War II. The stock is slightly heavier than the wood stock, and unless size is critical (as in a car or plane), you really are better to go with the standard stock. Despite this, I must admit I saw my first M1A1 carbine at Sutter's Sport Shop for $110 in 1962 and immediately fell in love with it. I put it on layaway, but by earning my money at $1.00 per day, seven days a week cleaning a coin-op laundry (I was 13), it took months before I managed to get it paid for and carry it home on my bike. I still have the carbine and still like it! But being more experienced now, I admit that the wood stock is better for shooting.

In 1944, the selective-fire version, or M2, came out. In testing it, I quickly found that the cyclic rate—coupled with the recoil impulse and pitch of the stock—did not make a very effective weapon. The first round in the burst was good, the second round would be on the man-target, but the third round was off target. Despite my experiences, the M2 carbine was always very popular in Vietnam, mostly shot by people who did not know how to shoot on full auto.

About the neatest modification I have seen of the M1 carbine (or M2) is to take it, put it in a folding stock, and then chop the barrel off in front of the forearm. You shorten the weapon by 6 inches and make a dandy little carbine. The velocity is a little lower, naturally, and hence the effective range is shortened, but it is still much better than a 9x19mm SMG. These weapons were popular with regional forces advisors in Vietnam. General Norman Schwartzkopf of Desert Storm fame carried one, and I encountered one while I was in the army, so it was apparently a common modification. Naturally, the same thing can be done with an Enforcer pistol put in an M1A1 stock. But remember to register it as a sawed-off rifle if you live in the United States.

The major failing of the M1 cartridge has been its lack of stopping power. Naturally, 110-grain, .30-caliber, round-nose bullets with thick metal jackets going 1,900 fps are not rifle cartridges, but they are within 85 percent of the power of the 7.62x39mm. I do not think anyone shot at 200 yards with a 7.62x39mm can tell the difference between being shot at 150 yards with a .30 carbine. Frankly, my military cartridge of choice has always been tracer rounds because associates have convinced me that they were particularly effective on personnel.

In a nonmilitary situation I always think of what Jim Cirillo, the famed former member of the New York City Police Stake-Out Squad, told me: the only weapon that stopped every criminal in his tracks with one shot was the M1 carbine. He said that when it was loaded with soft-point ammunition, it was like an autoloading .357 Magnum. When you think about it, he is exactly correct.

Light and handy, the M1 carbine is fine piece of equipment, much better than many people are willing to admit.

M1A (MODIFIED) CARBINE

This modification of the M1A1 carbine could well be called "the advisor's gun" because it was very popular with U.S. officers assigned as advisors in the period before the general buildup of U.S. forces in Vietnam. I first became acquainted with it in 1965 while reading a copy of *Infantry* magazine and thought at the time that it was a very clever modification. Later, it warmed my heart to see an old photo of General Schwartzkopf with one when he was an advisor in Vietnam because it seemed clear from the photo that he was a "gun guy."

With Vietnamese forces armed with Thompson and M3/M3A1 SMGs, M1 Garands, BARs, and M1 carbines, this modification made a lot of sense. I would go so far as to say this is the way the M1 carbine should have been made from the beginning. With the barrel shortened to a foot or so rather than 18 inches, the whole weapon seems quite lively in your hands yet loses nothing in its ability to place rounds on target. You never will confuse the .30 carbine round so chambered for a rifle

The author fires the M1A1 (Modified) carbine equipped with a 12 1/2-inch barrel.

The M1A1 (Modified) has a 12 1/2-inch barrel and, in the author's opinion, is the way the M1 carbine should have built in the first place.

round either, which is, I believe, a good point. In actual tests, I found I could easily engage 10-inch plates from the kneeling position at 300 yards, and that is really about as good as you could want from such a weapon.

While many people complain about the stopping power of the .30 carbine cartridge, and "experts" who only went to the range or looked at ballistics tables sneer at it, real fighting men always seem to favor it. I think the .30 carbine cartridge should not be confused with a rifle cartridge but viewed rather as an autoloading .357 Magnum with its 110-grain, .30-caliber projectile at 1,900 fps.

The proper way to evaluate the M1A1 (Modified) carbine is to test it against an SMG, not a rifle. If you take a couple of SMGs of suitable types, such as the 9x19mm Uzi, MP5, and the 7.62mm PPS 43, you quickly will see that the cartridge is more powerful because the bullet either weighs more (in the case of the .30 PPS 43) or goes faster in any case. Additionally, although the MP5 fires from a closed bolt, the other two weapons fire from an open bolt, which means that they are very difficult to use beyond 200 yards. Similarly, the MP5 is difficult to use beyond 200 yards because of the lack of sight adjustment, which, coupled with bullet drop, means that you must hold so high at 300 yards that a hit is a chance affair. I realize that SMGs are typically not used at such ranges, but you can do so with the M1A1 (Modified).

The safety is faster on the M1A1 (Modified) than on any of the others mentioned, except the PPS 43, which, using a Garand-style safety, is at least fairly fast. However, I am always somewhat concerned about carrying a cocked, open-bolt SMG because dirt and leaves can get into the action, something you don't have to worry about with the M1A1 (Modified).

Overall length of the M1A1 (Modified) is less than the PPS 43 and about the same as the other two. The MP5 is lighter but not by much, whereas both the PPS 43 and Uzi are heavier. Additionally, the M1A1 (Modified) responds (at least to me) in a much livelier fashion than any of the SMGs and feels much more like a "game gun," which is always helpful for quick-shooting situations.

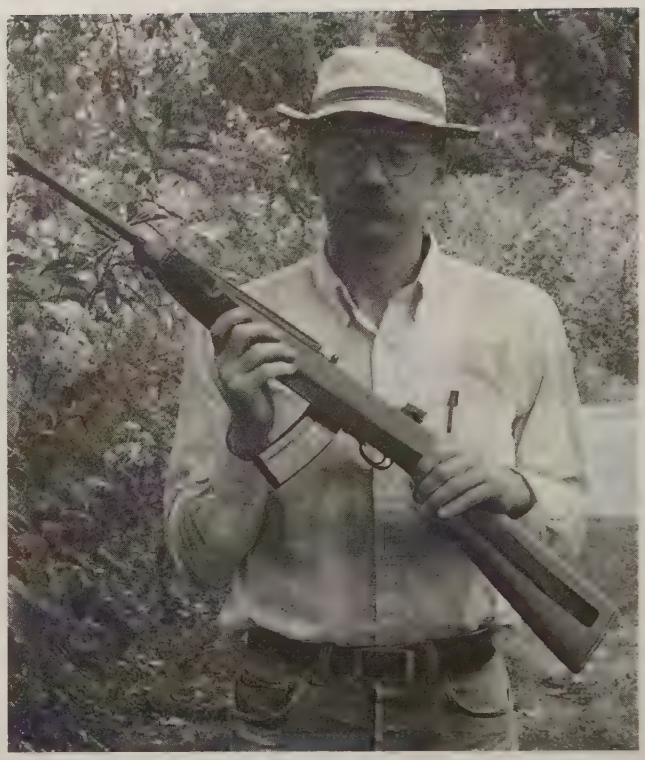
Loaded with tracer ammunition, the M1A1 (Modified) would be a dandy weapon for an advisor who has the job of directing troops rather than being in the front of the fighting. It is accurate, lightweight, and responsive when called upon. The M1 carbine emerged from World War II with an excellent

reputation for durability, and the only real criticism ever leveled against it was that it lacked power when compared with the .30-06 M1 Garand. This criticism was the result of a misinterpretation of the role of the weapon: it should have been viewed as a weapon more powerful and accurate while lighter and easier to shoot than an SMG, not as a shortened rifle (which, of course, is the traditional definition of a carbine). Certainly, I know I would much prefer the M1 carbine to any 9x19 or .45 ACP SMG used in World War II. Even the best of them, the Owen, ranks far down when compared with the M1 carbine. With the barrel shortened to a foot or so, as on the test example, the weapon is even better.

M2 CARBINE

The M1 carbine is, I believe, a seriously underrated weapon. Many think the MP43/4 was the first "assault rifle," but a more thorough analysis shows that the M1 carbine can claim this role. It fires a projectile that weighs a little less and has a little less velocity than the 7.92x33mm round, but the weapon weighs 50 percent as much as an MP43/4. Many people who never had a chance to carry one disliked the M1 carbine because they tended to confuse it with a shortened rifle chambering the standard service cartridge—after all, that is the typical definition of a carbine. The M1 carbine did not take the .30-06 cartridge, but rather the less powerful specialty cartridge, and to many people it must have seemed to be quite lower powered. In comparison it was, but then so is the 7.92x33mm round in comparison with the 7.92x57mm standard German infantry round. Perhaps if it had been called the "M4 Assault Rifle" people would have thought better of it.

Many noninfantry types tend to deprecate it as a weapon, but to the many who have carried it in the more than half century since it was introduced, it seems much better. It is light, handy, low in recoil, accurate, uses noncorrosive ammunition (especially critical in World War II when corrosive ammunition was the norm), and has adequate power and range for real-world infantry encounters.



If you want a quick-handling weapon that is accurate, takes lightweight ammo, and is easy to maintain in the field, the M2 is a fine selection.

The original M1 carbine went through some improvements from 1940 (when it was introduced) to 1944 (when the M2 was introduced). It got a better rear sight, which allowed greater adjustments; the safety release was altered to help those who could not tell the difference between the safety button and magazine-release button; and a bayonet lug was installed. Although the latter two modifications seem to be of dubious merit to me, the better sight is clearly an improvement. In fact, by 1944 when the M2 was introduced, the M1 carbine had reached its final form.

M2 carbines come in two variations: guns originally produced as M2 carbines and M2 carbines modified to M2 specifications with a conversion kit. Both appear the same, except for stamping on the receiver bridge, and both function in the same fashion.

The author firing the M2 carbine in two three-shot-burst mode. Note the three empty cases in the air.

The M2 carbine stock is slightly thicker and wider to accept the selector cut, but otherwise is the same as that found on the M1 carbine. The weapon is to be kept on semiautomatic unless there is a need for full-auto fire. Unfortunately, inexperienced troops tend to keep them on full auto, thereby depleting their ammunition (much as they do with the M16 rifle), and for that reason, the success with the M2 carbine is limited. Had the weapon been used as anticipated, the weapon would be more highly regarded, I am certain. Because of the stock design, full-auto fire causes the weapon to cant upward to the extent that effective fire at anything other than very short ranges is impossible. The cyclic rate runs anywhere between 600 and 800 RPM, and that rate (coupled with a recoil impulse that is greater to sustain than a 9x19mm cartridge and the stock angle) results in poor performance on individual targets.It works well for firing at night or in an area you wish to saturate with projectiles, but not against individually defined targets. For that scenario, fast semiautomatic fire is much better.

Although the safety on the M2 carbine is fast to use, the selector is slow. However, since the weapon really should be kept in semiauto (except for rare occasions), I do not find that to be a real drawback.

I rather liked the M2 carbine because it has all the good points of an M1 carbine in its latest and best variants and gives you an option that could become handy, yet gives it to you in a fashion that is not burdensome. As a boy of 13, I got my first one and soon discovered that shoulder-fired, full-auto fire was worthless. It was a valuable lesson that stood me in good stead later. However, no one forces you to shoot it in full auto, and as a fast, semiautomatic, it is a fine battle weapon. The key is not to confuse it with a rifle and ask it to perform a task it was not designed to do. But if you want a quick-handling weapon that is accurate, takes lightweight ammo, and is easy to maintain in the field, the M2 is a fine selection.

JOHNSON SEMIAUTOMATIC .30-06

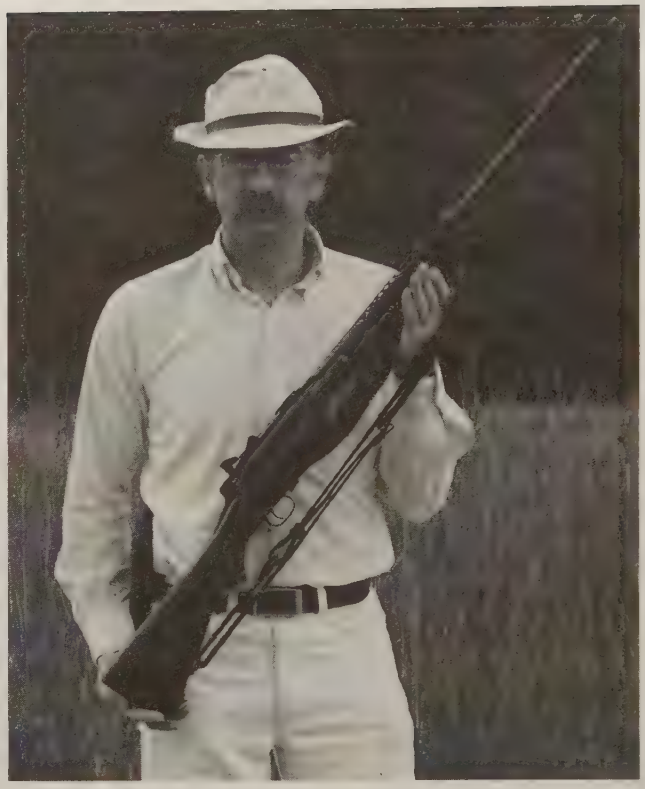
The Johnson semiautomatic rifle in .30-06 was the main competitor of the M1 Garand. John Garand, who was a Springfield Arsenal employee, had slowly put together his design for the M1 Garand. It was adopted in 1936, and series production began. Almost immediately, problems developed with the Garand, and at about the same time Melvin Johnson released his semiautomatic rifle. As hard is it to believe today, at the time many people thought that it was impossible to make a semiautomatic rifle to fire the .30-06 cartridge. Johnson promoted his rifle as a replacement for the ill-functioning M1 Garand rifle.

Extensive tests were conducted during the period, and although some thought the Johnson was superior in some aspects, no one thought it was that much better to merit withdrawing the M1 Garand and scrapping the investment made in that weapon. The problems with the M1 Garand were, of course, overcome, and it served out the war in a good fashion, though limited by features imposed on the designer (such as the integral magazine), not things that were necessary to the design.

The Johnson, while not adopted by the U.S. Army, was widely used by the U.S. Marines in the early days and was sold the Dutch East Indies army. It was also sold in Latin America to a limited degree.

The Johnson rifle has a very straight stock, although it is not apparent until the rifle is actually shouldered. Melvin Johnson understood that the straighter the stock, the easier it would be to keep the weapon under control when it recoiled. On most rifles, I find that I must raise my head to see the sights, thereby frequently losing my stock weld. On the Johnson, however, because of its straight stock, I have to force my cheek down to see the sights. It reminds me of the Czech ZK 383 SMG in this regard.

One of the main drawbacks of the M1 Garand, in my judgment, has always been the fact that you cannot load it until the weapon is empty (this problem was ultimately fixed with the M14 rifle). With the Johnson, you can load the weapon while a round remains in the chamber. Perhaps because of the military's concern about the manual of arms, the Johnson does not use a detachable magazine, but rather a rotary magazine of 10-round capacity. Why these prewar designers did not simply use BAR magazines has always been a mystery to me. But with the Johnson, you can insert new rounds in the rotary



The Johnson .30-06 semiautomatic rifle was developed by Melvin Johnson at about the same time that the Garand was introduced. The U.S. Army tested it to compare it with the newly adopted M1 Garand, which had some rather serious flaws. Although it was found superior to the Garand in some ways (particularly in that it could be reloaded while there were still rounds chambered and it did not have a gas-operated system, thus making it easier to clean in the field), it was not found to be that much better to justify scrapping the Garands.

The Johnson semiautomatic is loaded by inserting cartridges through the area where the thumb is located. The weapon can be loaded with single rounds or with Springfield stripper clips, and it can be loaded while there are rounds remaining in the chamber.

magazine by either a Springfield five-shot stripper clip or single rounds. Although still not as good as a detachable magazine, such a system is superior to that found in the M1 Garand and avoids the extra expense of the M1 Garand clips.

The safety on the Johnson is a little flipper in front of the trigger guard. You must push it to the side to disengage, and, frankly, I did not find it as fast as the M1 Garand safety. The trigger guard is also quite small, which could create a problem in the winter. The buttplate lacks a trap to hold cleaning equipment.

The Johnson uses a recoil system to operate the weapon, unlike the gas system of the Garand. As such, maintenance (especially with the wartime corrosive-primer ammunition) would be easier because there is no gas system to clean. Frequently, recoil-operated systems do not work as well, however, if they are held loosely. I encountered no such problems, and perhaps the .30-06 cartridge has an adequate supply of recoil to allow functioning despite a loose hold. I did notice, however, that the Johnson kicked more than the FN-ABL .30-06 rifle I tested the same day with the same ammo.

The barrel on the Johnson is exposed rather than being encased in wood like the M1 Garand. The top has a heavy metal ventilated handguard, but even though I fired only 50 rounds through the weapon in one sitting, I noticed that it quickly got very hot. The metal handguard got too hot to hold, and I fear that I would have burned my hand had I been forced to grab the rifle by the handguard. The wood likewise got very hot in quick order. It was about 90 degrees that day, but I am certain the Johnson was fired in places just as hot during the war. Any semiautomatic rifle should have a forearm that will deflect heat so that the shooter can comfortably hold and carry the rifle after firing it rapidly a few times.

I did not find the Johnson a very pleasant or easy rifle to shoot. Had I been forced to select between the M1 Garand and a Johnson in 1940 (production expenses aside), I would have probably picked the Johnson because it can be loaded while a round remains chambered and it has no gas system to clean. But even so, the Johnson is capable of a number of improvements. Perhaps the way to look at it is rather like the speaking dog: it is not how little the dog says that is remarkable but rather that the dog says anything at all. In a day when semiautomatic rifles were very rarely chambered for a major service cartridge, Melvin Johnson's ability to develop a rifle quickly and with no government subsidies is a marvelous accomplishment. That he could have done better is no major detraction from the praise that should be given him for doing what he did when he did and how he did it.

JOHNSON LIGHT MACHINE GUN M1941

Melvin Johnson is one of those figures in

U.S. ordnance history who made very interesting weapons that had lots of good design features and sound thinking in them, but who, because of his timing and the fact that he was an outsider, never really "made it." What happened to both his semiautomatic rifle and his M1941 LMG bears this out.

His LMG is best compared with the BAR on a tactical level, but is actually more flexible. It also is lighter, which endears it to any infantryman. Yet despite this, because of timing, it was never really widely used. Of course, ordnance experts had a very valid point in that they were primarily concerned about getting weapons into the hands of the troops, not necessarily the absolute best weapons but ones that were available in quantity and with known reliability. The BAR was in production, well known for its reliability, and if it was not as tactically flexible or as light as the Johnson LMG, well, that was the cost of admission: the war was to be fought in 1942 not 1952. Still, the Johnson M1941 was used by some U.S. Marine units that got their hands on them and some special raiding units that were outside the traditional chains of supply. In those hands, it proved to be a good LMG, but, of course, in such hands, almost any decent LMG would have been good—generally, the better the troops, the less the quality of materiel matters.

The Johnson uses a side-mounted magazine, which avoids the offset sight problem with some designs yet still allows a low-prone position that is sometimes precluded by high-capacity box magazines. Unfortunately, it uses a single-column box magazine and, hence, is longer than it needs

The author firing the Johnson M1941 LMG in full auto (open bolt) mode.

to be, thereby sticking farther out. The full magazine also tends to cause the weapon to tip in the hands when firing off-hand because of the weight on the side of the receiver. Interestingly enough, the magazine holds only 20 rounds, yet when inserted into the weapon, another five can be stripped into it, thereby allowing the shooter to start out with 25 rounds anyway.

Being able to load the magazine while in the weapon from stripper clips allows the shooter to change ammunition in midstream, if necessary. For instance, if tracer ammunition is indicated to allow the shooter to point out a target, he could pull the bolt to the rear (assuming it was in semiauto mode; if it was in full auto, it would already be open), and then feed the tracer rounds into the top of the magazines either individually or by stripper clips. Frankly, I doubt this was ever done in combat, because swapping ammo types in the middle of a fight seems a dubious practice, but it is a feature that does little harm, I suppose.

The magazine must be firmly thrust into the magazine well, and since the feed lips are on the receiver not on the magazine, as they are on most weapons, there is no need to worry about bending the lips. If the magazine is not thrust firmly, the rounds will be released, yet the magazine will not catch on the latch and it will be impossible to latch, so push or thrust hard to make certain you get the retaining latch caught.

The sights on the Johnson M1941 lack protective wings and are thus not protected from damage. The rear sight folds down and is a two-position peep unit. I would prefer some protective wings to the folding arrangement, and the two peeps in the same sight seem destined to be mistaken in a crisis, causing shots be be either high or low.

The weapon has a grip safety under the trigger guard and thus must be depressed firmly or the weapon will not fire. It is not obvious, and you must be certain to grip it firmly. It does not protrude like many grip safeties, so watch this point.

The rear view of the Johnson M1941 rear sight. Note the two peeps for different distances, which causes some confusion. The lack of protection can allow the sight to be damaged easily.

The barrel is a quick-change type that uses a loaded cartridge tip to push the pin out of place. Unfortunately, it has no handle to pull it out with, but perhaps the front sight could be used or a rag would suffice. Since the barrel has the sight on it and it is a fixed sight, I wonder how accuracy would be affected by such action, but perhaps the use of tracer ammunition would make up for it or the tolerances would be close enough to offset the problem. I doubt it. But maybe the barrel removal was more of a cleaning method than anything else. Of course, the Johnson M1941

does not use a gas system, so cleaning even with corrosive primers being used was easier than with a BAR anyway—another good point for the Johnson M1941 LMG.

Of course, the big selling point for the Johnson was its ability to fire semiautomatically from a closed bolt, thereby getting the benefit of a traditional rifle while firing in the full-auto mode from an open bolt and avoiding cook-offs. Frankly, I have always thought this cook-off problem was overrated, at least with squad automatic guns: I do not think anyone fires them fast and long enough to create a problem in actual combat, as opposed to tests. I know that 200 rounds fired fast through an M14A1 will not result in a cook-off, so I am not clear why it would in a BAR or Johnson M1941. But in any event, the big feature that made the Johnson M1941 different from the BAR was this ability to fire from two bolt positions.

Interestingly enough, if you put the selector lever in semiauto, the bolt will run forward and the trigger pull, which is like that on a traditional rifle, is harder than when firing from the open bolt. If you are firing in semiauto and wish to fire in full auto, you flip the lever and then pull the bolt to the rear, ejecting the chambered round. The bolt will stay in the rear, and you can fire bursts. The cyclic rate is low enough to fire single shots easily, and control is acceptable—although the weapon does jump around more than a BAR, in my judgment. If the LMG is on full auto and you wish to fire in semiautomatic mode, merely flip the switch to semiauto and the bolt will close, but the weapon will not fire. You can now shoot it as a conventional rifle.

I would have liked an opportunity to test the M1941 in both positions, firing, say, 25 rounds fast at 300 yards to see which gave me better results on target. When I did that and the same test on the closed-bolt Heckler & Koch 21 LMG, I found that results were better on semiauto. I am fairly certain the results would have been the same with the Johnson M1941, but, unfortunately, I cannot say for certain. I cannot imagine that firing from the open-bolt position would have made for better results.

The Johnson M1941 is an interesting weapon. Although it is somewhat more flexible and lighter than a BAR, I cannot fault the U.S. ordnance corps for concentrating their energies on the BAR. I would have done the same thing. What Melvin Johnson should have done is delete the full-auto feature, make it hold 20 rounds in a detachable magazine of double-column design, trim off 4 pounds, and give the infantry the AR-10 in 1941. That would have been a real improvement over the M1 Garand or the BAR!

SPRINGFIELD 03A3—SNIPER

Many people love the Springfield M1903, but I am not one of them. I have always found it difficult to shoot because of its poor sights. Many people claim they are wonderfully accurate. However, that has not been my experience, because, I believe, the poor sights simply prevent my being able to shoot the rifle properly. I even once bought a 1930s-vintage National Match M1903 to see whether I could shoot it, but I had no success. Give me an M1917 Enfield any day.

However, I undertook my testing of the 03A3 sniper rifle with much greater anticipation since I knew I would not be burdened by the poor sights on the standard rifle. In fact, the rifle has no iron sights at all, relying instead on the low 2.2X power Weaver 330 scope fitted on the bridge mount. Such a setup with no iron sights might well be satisfactory on a sporting rifle that tends to get used only a few weeks each year and will be "babied" by the owner, when the most serious consequence of a poor shot is a lost game animal, but I have some doubts about the philosophy when applied to a military sniper rifle that will be banged around and used in the field for months on end. I do believe the scope should be mounted low to prevent the shooter from having to take his head off the stock, thereby losing his firing position, but I also believe iron sights should be fitted. Additionally, the scope cannot be removed

The 03A3 sniper rifle is a poor reflection on the ability of U.S. manufacturing during World War II. Here, the author holds the M1903A4 mounted with a Weaver scope.

without a screwdriver, so it ought to be issued with the rifle unless the screw slots are the same size as something else that is always available to the soldier.

Perhaps the best example of doing what I am proposing is found with the No. 4T Enfield sniper rifle. It uses a cheekpiece to get the shooter's head high enough, yet uses a low-mounted scope. However, the iron sights remain. The Enfield scope can be removed with thumb screws. Frankly, I think such screws tend to encourage removal, and my experience has been that no rifle ever shoots exactly the same POI once the scope has been removed and replaced. Certainly, they do not on the Enfield sniper units I have tested. They may be close, but at real sniping ranges (600 to 800 meters), a little off gets to be a lot. The better policy is to leave the sights on and then firmly mount the scope with screws. The soldier should remove the scope only if it gets damaged. Then he would have at least a rifle with sights to use for fighting as a trained marksman. His shooting ability might be reduced but at least he could get some results. A sightless rifle is basically worthless beyond 100 yards even in well-trained and experienced hands.

The scope mounted on the test example, a Weaver unit, had simple cross hairs. Such cross hairs tend to get lost when conditions are dark; because one of the purposes of a military sniper is to gain 45 minutes or so at each end of the day, this reticle is an unfortunate choice. Eye relief is acceptable, although the field of view is limited. Once again, I was reminded that telescopic sights have improved a lot since 1945. Although a lot better than the 1918-vintage Pattern 14 Enfield sniper rifle I have used previously, it still was not as good as my Leupold made in the early 1980s that I shot the same day.

The 03A3 Sniper rifle has a standard trigger, which also limits the shooter's ability to place rounds accurately at distance. A good trigger makes it easy to hit distant targets; an accurate rifle makes it possible. You can get the same results if an accurate rifle has a poor trigger as you can get with a good trigger—it is just a lot harder. Why the military did not go with a better trigger on these rifles is a mystery to me.

The safety is very difficult to operate because of the close proximity of the safety lever to the scope tube. I assume most snipers just ignore the safety and leave the bolt slightly ajar, closing it when ready to fire, as a faster and safer way to handle the weapon.

The 03A3 lacks a cleaning rod but does

have a butt trap for cleaning gear. The 03A3 stock is short like the standard Springfield, but a short stock can be managed whereas a long one is very difficult. Also, in cold weather and with the shooter wearing thick clothes, a short stock is better.

The rifle is heavy and slightly ill balanced for either off-hand or kneeling shooting. Recoil is not heavy, obviously, nor is blast because of the 24-inch barrel.

Shooting Federal Premium ammunition, I found the groups disappointing. The rifle I tested had not been properly sighted, and I was reluctant to change it. Therefore, I had to hold off to get hits. Still, a sniper rifle ought to do better than 1 1/2 inches at 100 yards. Perhaps the stock was dried out; the weapon itself, dated January 1944 on the barrel, appeared to be in excellent condition. I doubt it had ever been issued.

The 03A3 sniper is a poor reflection on the ability of U.S. manufacturing during World War II. Had as much attention been given to a sniper rifle as to the B-29, and had even the cost of one B-29 been diverted to sniper rifle production, much better results could have been achieved. Clearly, the U.S. military did not lead the way in terms of sniper rifles during World War II.

M1903 WITH UNERTL SCOPE

During World War I, there were some rifles and scopes in the U.S. arsenal, but generally they were not as good as British military weapons. Between the wars, sniping fell into disuse, as it typically does in times of peace, but it was soon obvious that sniper rifles were needed and the U.S. military cast about for a proper sniping rifle.

Unfortunately, sniping tends to attract people who are competitive rifle shooters rather than manhunters, and, as a consequence, they tend to advocate and promote the development of rifle-and-scope combinations that are more suitable for the target field rather than the battlefield. The

U.S. forces with Springfield M1903A4 sniper rifle with Weaver 330 scope firing at Japanese soldiers along the Burma Road in 1945. From the lack of cover shown here, the enemy must have been quite a distance away and very little threat.

rifle evaluated here is a good example of just such a tendency.

The M1903 rifle is liked by many as a good-shooting military rifle, and I suppose it is accurate enough with proper ammunition. I have always found the sights difficult to see and use, but many people are able to do fine work with them. I suppose it made sense to adopt an M1903 rifle, given the availability of spare parts and familiarity with the rifle for maintenance. Although there are obviously better calibers for truly long-range work than the .30-06, the common availability of the ammunition in the supply channel more than offsets any deficiency the shooter might suffer from using the .30-06 cartridge.

The U.S. military adopted the Springfield M1903 to fill the need for a sniping rifle during World War II. One of the primary factors that led to its adoption over other available rifles was the availability of spare parts. Here, the author fires the Springfield M1903 fitted with an 8X Unertl sniper scope.

The 8X Unertl scope was fine when it was first manufactured, but the optic quality is far below what we can find today even on a moderately priced scope.

The sniping version continues to use the standard sights that, while not wonderful, at least give the shooter the opportunity to use iron sights if the scope becomes disabled. This is better than the model fitted with a Weaver 330 C scope, where no front sight is fitted. Better sights would be an improvement, but, of course, better sights would improve any Springfield. The example tested did not exhibit any modification of the trigger; it felt like any standard, good-condition Springfield rifle.

Of course, the key element in this model is the 8X Unertl scope. Like all Unertl scopes of whatever vintage, this one is a very fine scope. Even so, the optic quality is far below what we can find today even on a moderately priced scope. Again, it is

amazing how far optics have come in the past 50 years. Unfortunately, rifles have not come as far, and, naturally, men have not developed at all.

The scope is very long, has rather critical eye relief, and is adjusted through the mount rather than the scope itself. This last is a desirable feature because the adjustments can be made bigger and (one hopes) stronger when done through the mount. Additionally, unlike most scopes with which today's shooters are familiar, this Unertl has a sliding mount. Upon firing, the scope moves to the rear. This makes it easier to keep the scope from going out of alignment because much of the recoil impulse is absorbed by the scope moving to the rear upon firing. The drawback to this is that the shooter must push the scope forward after each shot to return it to the original position or results will suffer. Rapid repeat shots must have been troublesome to the marine or army sniper armed with this rifle. It probably worked fine for shooting at the range or plinking woodchucks, but recoiling scopes are simply not a good idea for a sniper rifle.

The scope is mounted low, which, of course, precludes rapid reloading with stripper clips. Even though the sniper may not need to reload quickly, reloading with stripper clips is easier than single loading and helps avoid cartridges being dropped in the mud or snow.

Besides the recoiling scope problem, the Unertl was fitted with a fine cross hair. Picking reticles is always a troublesome business. If too thin, as here, the cross hairs are difficult to see in poor light and thus interfere with proper target acquisition. On the other hand, some scopes have so much on the reticle in the way of posts, strategic lines, and what-not that you can hardly see the target. What is needed is something that allows you to see the reticle in poor light yet does not cover too much of the field. The Unertl reticle is simply not good for the combat field: it lacks anything to help the shooter estimate ranges, and, since most misses are due to poor range estimation, this is a serious error in design.

Although I realize that most sniper rifles are used in the prone position, I tried a few rounds kneeling, sitting, and off-hand because the military sniper may well find that grass between him and the target precludes the prone position from being used effectively. I could not effectively use this one in the off-hand or kneeling positions because of its weight, poor balance, and high magnification of the scope, which amplified my shaking.

Unertl scopes were obviously top-of-the-line competitive rifle or varmint scopes prior to 1941, but the rifle the military built around it was seriously flawed as a military sniper rifle. I certainly would have hated being issued one. Field maintenance would have been very troublesome, and I am not certain its benefits would be worth the price of admission. I fear I would have wished it off on someone else rapidly or "broken it accidentally" to get away from it unless I only had a unique, long-range task to perform.

BROWNING M1919 MACHINE GUN

The Browning M1919 machine gun is commonly called a light machine gun, and in a day when machine guns used water as a coolant, I suppose it actually was a "light machine gun." When you consider the difficulties of dragging a heavy mount, spare barrels, water cans, hoses, and main gun into position, while crawling through the mud under fire—and under heavy enemy fire—it is easy to see why men would think the M1919 was such a wonderful invention.

As with other Browning designs, the M1919 is a well-made, extremely dependable weapon. However, it is dated when compared with designs currently available. It is heavier, lacks the buttstock that allows it to be used effectively without a tripod (except in its M1919A6 variant, which was never well received), and does not have a quick-change barrel. This latter point was likely the result of the limited machining-skill level on large volumes; close tolerances are needed for rapidly detachable, quick-change barrels.

Members of the 2nd Ranger Company, 7th Infantry Division, man a Browning M1919 "light machine gun" at X Corps area in Central Korea in 1951.

The weapon can be chambered for a number of cartridges, and many recreational machine gunners like this feature, as well as the general low cost of the weapon and its parts. But you cannot determine the military utility of a weapon from recreational machine gunners who carry their weapons in automobiles and sit down to shoot them at clods of dirt. Rather, the weapon must be evaluated as a weapon, not a toy.

As a weapon, the M1919 LMG stacks up quite well, as most Browning designs do, on the basis of reliability and durability. The areas where it fails are rapid barrel change, which is critical for a light machine gun; weight of weapon, which limits mobility in the field; and ease of use. Unlike shoulder-stocked LMGs, which can be used as a weapon with a bipod, the Browning M1919 (except in the M1919A6 version) can only be fired off a tripod. Hence, it is effectively a crew-served weapon. One person can carry an MG 34/42/60 or MAG 58, but no one can carry an M1919 with its tripod affixed by himself in the field. Although firing an LMG from a bipod is obviously not as accurate for long-range or sustained fire as when fired form a tripod, the weapon with bipod can at least be put into operation against enemy forces. Try shooting an M1919 without its tripod and you will see what I mean.

The sights on the M1919 also leave a lot to be desired. If anything, they are obvious examples of a weapon-sighting system that

U.S. and Vietnamese troops mount the Browning M1919 on their airboats in preparation for a patrol in the Mekong Delta.

was designed to be used with tracer fire coupled with a tripod, unlike the sights on an M34/42/60 or similar weapons that truly can be aimed at a target easily.

The M1919 fires from a closed bolt, unlike many LMGs, which actually makes it easier to fire the first shot since the jarring common with open-bolt weapons is missing. However, the absence of the buttstock prevents this from being a substantial benefit to the shooter. It does make for problems associated with cook-offs, however, after a long use of the weapon. Although I have watched Kent Lomont shoot his Browning until the barrels turned white, and no cook-off was apparent. It could happen I suppose: I simply have never seen it. The cure for the problem is to lock the bolt to the rear when the shooting stops and push the release button when ready to get started again.

Oddly enough, the M1919 does not have any safety; thus, the only way to effectively render the weapon safe is to open the top cover. Because I do not trust open-bolt gun safety systems anyway, I do not view that as much of a problem. But it is odd that none exists because it would have been so easy to include it.

The cyclic rate on the M1919 will vary depending on the ammunition and weapon, but seems to average a little over 500 RPM.

This is a very controllable speed, and single shots and short bursts are easy to achieve. Such low cyclic rates save ammunition and barrels, although they also are bad for such fast targets as planes and other aircraft. The weapon uses belts of cloth or metal links; the former is nice for range use and the latter for the field. Empties are not flung far away, which can present a problem for soldiers because they build up and give away the position to the enemy, but it is convenient for reloaders. I am not certain that the long-flinging action of the Heckler & Koch 21 LMG is needed, but a little more distance with the Browning M1919 would be nice.

Overall, the M1919 was a substantial improvement over the water-filled LMG, such as the Maxim 08/15, the Vickers/Maxim, and Browning M1917, and it provided greater accuracy and firepower than a Lewis gun or similar weapon. However, the M1919 has been surpassed today as an effective fighting weapon. Rather than viewing it as a "light machine gun," perhaps it should be viewed as a "medium machine gun." It could be used for situations where a .50 M2 Browning might be called for, but using the M1919 would provide a substantial savings in overall weight as well as ammunition costs and weight.

M14—7.62X51MM

Many people like to say that the M14 is nothing more than a slightly updated M1 Garand rifle with an extension magazine. Perhaps that is true, but I am not certain that such a description is a bad thing, anyway. I like the M14 rifle. I used one in 1968–1969 while in the U.S. Army and found it to be a fine battle rifle. Later, I bought an M1A rifle, which is an M14 except for lack of the selector, and my opinions about the weapon were confirmed.

The standard M14 rifle comes with a selective-fire capability but has the lever removed, rendering it capable of semiautomatic fire only. This is not a big drawback because full-auto fire from light

The M14 is a fine battle rifle. Here, the author holds an M1A semiautomatic copy of the M14.

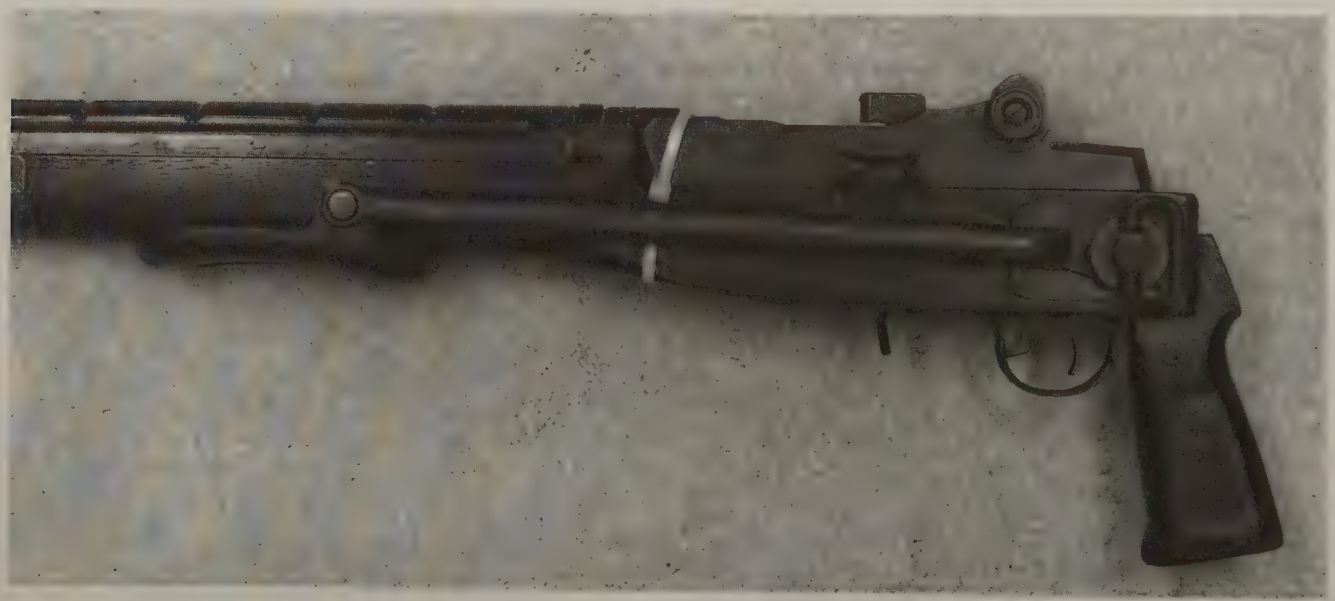
shoulder-fired weapons is not very effective anyway. When fitted into an M14A1 configuration, the full-auto feature starts sounding useful, but it is still not a real machine gun. The weapon fires from a closed bolt with a lightweight barrel and, hence, will get overheated quickly when many full-auto bursts are run through it. Similarly, it still weighs 10 pounds or more—less than it should to be useful as an LMG. You do better to keep the M14A1 locked into semiauto and fire fast, accurate fire. "Bullets hitting people is firepower," as Melvin Johnson, the noted designer, said.

Evaluating the rifle from the rear to the front and bottom to top, the buttstock has room for cleaning gear. I like this feature because when you are out in the field, it is nice to be able to pull out the necessary cleaning equipment and get started. Carrying such items in your pack or in a pouch on your belt (as was proposed when the M16 first came on line before the stock had a butt trap) is always inconvenient. Unlike the M1 Garand, the M14 has a folding buttplate in addition to the standard buttplate. Apparently, that was originally put on for full-auto control when the military intended to issue an M15 rifle (which was a heavy-barreled M14) as a squad base-of-fire weapon. The folding buttplate stayed on all M14 rifles. I guess it does no harm, but it is hard to see that it does any good.

Unlike many military rifles in the postwar era, the M14 does not use a separate pistol grip nor is its stock commonly made of plastic. Regarding the latter point, I have seen plastic stocks and I have some plastic stocks for my M1A rifle, but usually the M14 used real wood. Naturally, the wood warped when wet, changing the POI. I remember seeing one M14 where the wood had swollen so much it was impossible to remove the action from the stock. Such problems in Vietnam resulted in the development of the plastic stock, although by the time they were available, the M16 was beginning to push the M14 aside in Vietnam. Although I like the wood stock for shooting, I must be fair and admit that the plastic or fiberglass stock is better when operating in an environmentally hostile situation.

Unlike many postwar battle rifles, the M14 does not have a separate pistol grip, except in the M14A1 version. The separate pistol grip tends to make it easier to hold the weapon when firing with only one hand, but it seems to cramp the hand when firing rapidly from the shoulder. Perhaps it is just that most people who shoot at rapidly disappearing deer in the bush tend to use conventionally stocked rifles so that such stocks seem more comfortable than the pistol-gripped weapons. I never found that I had less control of my weapon with a traditional stock, but I never felt as though I was operating under a handicap by having a separate pistol grip to hold.

The safety system on the M14 is like that on the Garand and can be operated easily



The folding stock on this M14 was made at a government arsenal during the Vietnam War.

with gloved hands, in the dark, or with either hand. The design is, I believe, much superior to that found on many battle rifles where the safety must be flipped off with the strong-side thumb only. The selector system, on the other hand, is difficult to flip from full to semiauto rapidly, but because most rifles are issued without the selector and because full-auto fire in a lightweight battle rifle is rather silly anyway, who cares? Like the safety system, the magazine release is quick to use and can be used by either hand. This system also avoids the problems associated with button releases that get accidentally pushed off or cannot be pushed off in the winter when heavy gloves are worn.

The stock forearm is nicely shaped and easy to grasp by the weak hand. Unfortunately, it is not insulated, and firing rapidly will cause it to get very hot in short order (but no hotter than the thin forearm found on the H&K G3 rifle). The top of the handguard is made of fiberglass or similar material. It also allows heat to penetrate, and it rattles unless taped down. If you fire too fast and too long with your M14, even with semiautomatic fire, you can ignite the wood stock (I have done it) or melt the upper handguard (a friend did this during a Vietcong ambush in Vietnam—11 magazines in two minutes will do it).

The gas system on the M14 was originally one of the main problem areas. Even with the gremlins removed, it still suffers from a lack of adjustment. Weapons do get dirty. Ammunition will vary in power because of manufacture, age of the ammunition, conditions under which it was stored, and the prevailing weather. With the M14 gas system, the only two options you have are fully open or totally closed. Closed, naturally, the weapon will not function. Open, the weapon will function as long as the ammunition is powerful enough and not too dirty. A better solution is found on the FAL rifle, where you can adjust the weapon's gas system for prevailing ammunition capabilities. By doing that, you can avoid battering the weapon when the ammunition is "hot" and yet still get it to work when the weapon is dirty or ammunition is underpowered. The flip side of that is that soldiers will play with such items and, no doubt, misadjust them. I still like the option for a gas-operated battle rifle.

The flash hider on the M14 seems to work quite well. It is longer than that found in late-production FAL rifles or the G3, but it seems to work as well. I find its appearance quite elegant. The front sight is adequately protected and open at the top, unlike that on the G3, and easier to use. Although somewhat thick for fine target work at extended range (easily remedied by using the National Match front blade), it is perfectly suitable up to 500 yards. I would prefer if it were white, but this can be remedied by a little paint. The M14 lacks a night radioactive sight, and this is a serious flaw. When the rifle was released in 1957, these sights simply were not available. By the time it went out of general issue, they still were not common. Fortunately, it can be remedied by painting the front sight with glow-in-the-dark paint, but this does not really excuse this failing. Much infantry work takes place at night, and the soldier must be able to use his sights if he is to place his rounds with any consistency.

The rifle offers the capability of using stripper clips as well as the box magazine. Because ammunition is encountered in five-round stripper clips, that can be an advantage, although I rather doubt it is likely to be used in actual combat. Most likely it is merely used as a way to load the magazines rapidly when the magazine-loading tool is missing. It does not hurt but does not really need to exist.

The cocking handle on the M14 is easy to use but does require the shooter to break his shooting grip, unlike on those rifles (such as the FAL) where it can be pulled to the rear with the nonshooting hand. The Galil series, of course, avoids this problem while still keeping the cocking handle available to the right hand by angling the handle upward, thereby making it available to either hand. This is really a better solution.

The rear sight of the M14 is familiar to anyone who shoots the M1 Garand, and it does offer a nice sight picture. As long as it is not worn by constant clicking, it will hold its elevation and windage. It is protected from side blows, although I have seen the peep portion bent over from a blow to the top, which obviously will alter the impact of the bullets. Also the lock on the right must be kept firmly locked down to prevent the sights from getting out of adjustment, but once locked properly, they will hold both the elevation and windage well.

The M14 has a hold-open feature to tell the shooter when the rifle is empty, always a nice feature. Accuracy in the M14 has always been good to excellent in my experience. Although factory acceptance calls for a 3-inch group at 100 meters, every one that I have ever managed to test on paper has done no more than 2 inches, and a match-grade model will get under a minute of an angle. It was the fine accuracy of the weapon that allowed the M21 sniping system to be developed from the M14 originally.

Depending on the stock, the M14 is a little lighter than the FAL and noticeably lighter than the G3. It is accurate and reliable. An adjustable gas system would be a welcome addition, as would be a fiberglass stock with heat deflector in the forearm, but even without these items, the rifle works well. As the final refinement of the battle-proven M1 rifle, it has had the bugs worked out. You will like it if you try it, even though it is not as exotic looking as some models you may encounter.

M60

This was the standard LMG used by U.S. forces during the Vietnam War, and that is when I first encountered it. The design is a combination of features from the Lewis gun and the German FG-42. With such a background, one would assume that the M60 would be a fine weapon—but, alas, it is not. In fact, it is probably one of the worst LMGs fielded by any major army in the past 30 years.

A good machine gun should be reliable, accurate, controllable, and lightweight. The M60 is no lighter than the MAG, Soviet PK, or MG 3, which are its basic competitors. The 600 RPM cyclic rate is excellent and would push the M60 to the head of the class, except for its failing on the reliability and accuracy fronts.

The initial M60s had two very serious problems that were corrected later. First, the barrel was readily detachable, but it had no handle on it. Instead, it came with a mitt that the shooter had to wear to grab the barrel. Naturally, such mitts were soon lost in the mud, and then field-expedient towels, shirts,

The M60 is probably one of the worst light machine guns fielded by any major army in the past 30 years.

A member of the 173rd Airborne Brigade fires his jeep-mounted 7.62mm M60 machine gun at suspected enemy positions during a road security mission in Vietnam.

etc., were used instead. A friend of mine burned his hands to the bone pulling out the barrel of an M60 with his bare hands when the North Vietnamese infantry attempted to overrun his position in South Vietnam. He did not feel it at the time, but after the battle was over, he discovered the condition of his hands. Later M60s had a handle on them that could be used to pull out the barrel. Second, early M60s also had fixed front sights. This meant that you adjusted the rear sight to get the bullets where you wanted them to go, but then when you changed barrels, the impact was off. If the sight is on the barrel, adjustment for machine guns must be on the barrel if you are to hit your POA at great distances. That way, the new barrel you install will hit the same POI as the old barrel did. This was finally changed on the M60, but why it was ever designed with fixed front sights is inexplicable.

The problems with the barrel handle and the fixed front sights were corrected, but what was not corrected was the M60's general lack of reliability. Unlike a military handgun, or even rifle, machine guns will shoot a lot of ammunition. When evaluating reliability, the standard must be as high as that found in other existing weapons, at a minimum. When you see the 10,000-round 7 1/2-minute, single

The cover on the M60 is raised, illustrating the mechanism.

continuous burst that Kent Lomont fired from an MG3 or the 500,000 rounds fired by him in an FN-MAG—many in bursts long enough to turn the entire barrel red hot all the way out to the muzzle—you see what the standard truly is for LMGs. The M60 cannot meet this standard. After about 20,000 rounds, the sear will turn round, and the shooter will encounter runaway gun problems. Second, the design is faulty in that a number of parts can be put in backward. Unfortunately, you may not realize that until you attempt to fire the weapon. The weapon will then lock up, and you must field-strip it to get it back in operation. This is not a pleasant prospect with North Koreans swarming through the barbed wire.

The forearm of the M60 is adequately protected from heat but is really too wide to be held comfortably. The finish on the top latch, which is aluminum, will chip and flake rapidly. On many guns that have seen a lot of use, the finish is almost totally gone, leaving the gunner with a shiny weapon that is sure to attract the enemy.

The pistol grip is nicely shaped and comfortable to hold even in bad weather because of the plastic coating on it. However, the trigger guard is smaller than is desirable when winter conditions are considered. The safety is handy, especially for right-handed shooters, but I really do not trust any safety on an open-bolt machine gun, preferring instead to leave the bolt closed until ready to fire the weapon.

The M60 has a bag that you are supposed to be able to attach to the side of the gun to hold ammunition. I have seen it used only a few times and never in the field. This brings up a very big problem with all such belt feeds: the inability to carry the weapon with ammunition in it. The typical response is to put a short length of belt containing 10 to 20 rounds in the gun, called a "cheater belt"" Upon contact with the enemy, the shooter will fire off that belt and then reload with a standard-length belt. The problems with this system are that the belt clangs on the receiver

U.S. troops ford a stream in Vietnam with an M60. Note the "cheater belt" in the M60 and the method of carrying the spare belt. Such a method causes debris to get into the belt and also makes noise on patrol.

and alerts the enemy to your presence and that the belt is positioned in the open, exposing the ammunition to dust, dirt, twigs, and mud. Having such debris in the receiver is not the best way to ensure the reliability of a machine gun. An additional problem is that it basically causes the machine gunner to carry a heavy, limited-firepower weapon when initial contact with the enemy is made. A better solution is one that is found with the M249, which allows the gunner to load the machine gun with magazines or belts. Naturally, you use the magazines when walking along and only insert the belts when you assume a defensive position.

The bipod on the barrel of the original M60 was located poorly because the weapon would collapse when the barrel was removed from the receiver. This was fixed, however. The tripod on the M60 is heavier than the MAG mount, which is made of lightweight alloys, and is much less sophisticated than the MG3 tripod. An M60 on its tripod can be used at 1,100 meters, whereas the MG3 with its considerably more sophisticated unit can be safely fired over troops' heads at extremely long ranges. Although the tripod for the MG3 is rated for 3,500 meters, German sources tell of it being used effectively at 3,800 meters on the Russian front when the same tripod was used with the MG 42. That is

more than three times the range you can get with an M60. It is the tripod that allows the more effective use of the MG3.

All things considered, the M60 is a rather sad example of what the U.S. arms industry can do. Certainly, U.S. manufacturers should be able to produce a weapon that equals or surpasses what the Germans used in World War II, but if you look at the M60, it appears that they cannot. It would almost be funny if not for the consequence of their failure being that the soldiers and marines who are forced to carry the M60 into combat will be killed or injured when their M60 fails them. A poorly designed or manufactured pistol may get one soldier harmed, but a bad platoon- or company-level machine gun can result in the deaths of whole platoons or companies of fighting men. It is an outrage!

M79 GRENADE LAUNCHER

During the Vietnam War, the M79 grenade launcher was adopted and widely used. It is one of those one-war weapons, but which, despite a relatively short service life, is still a very important weapon. Throwing grenades is, at best, a difficult proposition. Grenades are heavy and slightly dangerous, and have an effective range that is really quite minimal. On the other hand, you can often do things with a grenade that cannot be done without it or, at best, only accomplished at great risk to your person. As soon as grenades appeared, people started trying to figure out ways to throw them farther than they could by hand. Various slings and devices to launch them via a rifle were tried. In fact, rifle grenades were once common, but because they tied up a rifle and really did not provide any more accuracy and delivered a punishing recoil, they were not well accepted by infantry troops, except in very special situations.

The M79 grenade launcher appears to be a simple break-open, short-barreled shortgun, except that it is rifled, thus allowing firing the grenade with much greater accuracy than would otherwise be the case. Recoil would naturally be punishing if it fired a standard projectile weighing what a grenade does, but, instead, it merely lofts them out at 250 fps. Recoil thus is quite mild, rather than on the order of a 20-gauge field load. The report is likewise quite low, a mere low-intensity pop. The grenades themselves are bore safe because they must spin a number of times before the internal safety pin is thrown out by centrifugal force. Unless it is more than 8 meters away, they will not explode even if they hit a hard object. They are not triggered by a time fuse, but rather an impact fuse. Last, the charge inside is quite small, and the projectiles inside are both numerous and light so the deadly range is about a 5-meter radius.

The weapon is equipped with sights, but

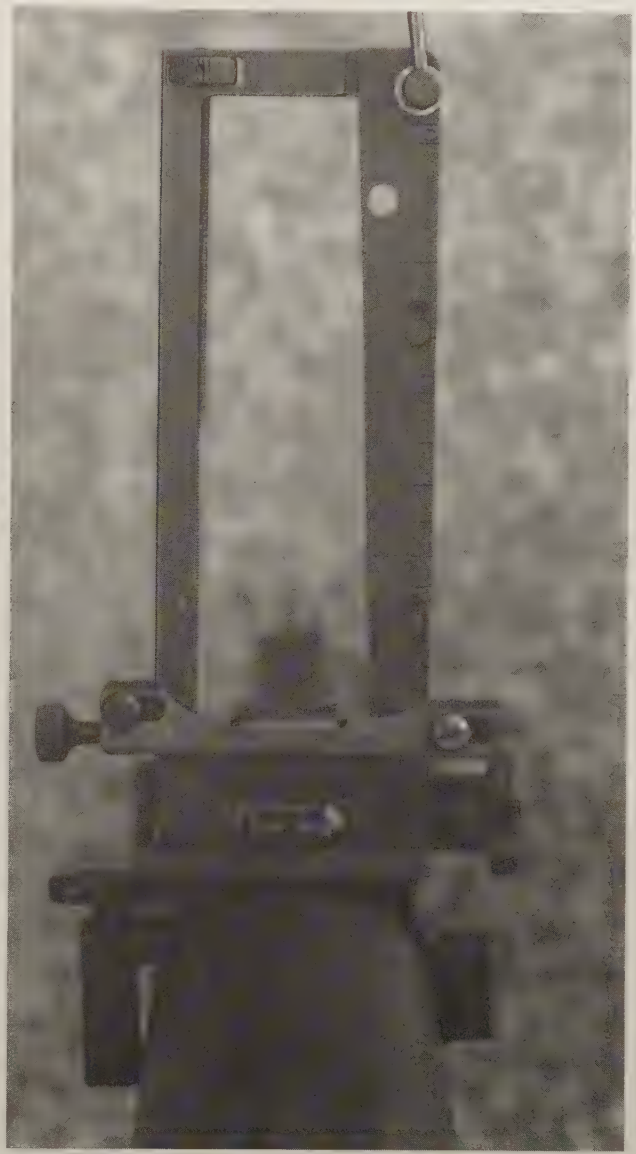
Despite its many good points, the M79 required a dedicated operator, and it was only tolerated in Vietnam until something better came along. That something, of course, ultimately was the M203 grenade launcher, which can be mated to the M16A1/2 rifles (as well as others). Once that system came on line, the M79 soon disappeared from the inventory, a weapon of short life, but one representing a very important development and advance in infantry-, squad- and platoon-level firepower.

The action is open on this M79, showing a fired case, partly extracted.

experienced grenadiers soon get the feel of it and are able to hit distant targets without using the sights. It can be used at point targets up to 150 yards without problems and has a maximum range of 450 yards against area targets. It can be used as a substitute mortar when two men operate it.

The only real difficulties with the weapon are that it is a single-shot weapon and that it takes a rifleman away from the rifle squad to act as grenadier. You really cannot expect a man to carry and effectively use an M79 and a shoulder rifle. Plus the M79 man must carry his spare ammunition. The grenades are bulky and as heavy as two magazines of M16 ammo. Typically, you end up with the M79 man carrying his pistol to back up the M79 and the squad rifleman protecting him from the enemy.

I have never been an M79 man, although I have fired perhaps 100 grenades through a few different examples. Ammunition is available in smoke (different colors), tear gas,



The M79 has sights, but most people shoot them by feel unless the distance involved is more than 150 yards. Here, the rear sights are extended for use.

buck shot, practice rounds, flares, and high explosive. Although buckshot rounds were tried, most people felt that this was no better than a 12-gauge shotgun and what was left was a single-shot weapon. If I am going to use smoke or gas, I will use a standard grenade, and the same theory applies to flares. That pretty well leaves us with practice rounds and high-explosive rounds. Practice rounds are readily available, but high-explosive rounds

are considered "destructive devices," so unless you are in the military or live outside the United States, you are unlikely to be shooting too many of them. Fortunately, you can learn just fine with the cheaper practice rounds.

Possibly, the best way to describe the ease with which this weapon can be shot is to state that I can fire a grenade into a standard 30-by-30 inch window area at 100 yards off-hand every time. I can fire into an area the size of a pickup truck at 400 yards every time. Really good people can put rounds into a trash can at 150 yards.

The front sight is a standard U.S. military style protected by sturdy wings. The rear sight is rather involved with ranges on it, and if you wish to use it beyond 100 yards, you can do it by feel. To open and load the weapon, you push the lever to the side and break the barrel down. This will cock the weapon. Insert the round and close the weapon vigorously.

There is a thumb safety. This is a combat weapon, not a sport weapon, and just like the elephant hunter's double rifle, the safety does not go on automatically when you open the rifle. You must put it on manually. You do so at once. When you are ready to fire, flip off the safety, put your finger in the trigger guard, and fire. Watch for overhead obstacles that will fling the grenade back into your face and make certain the target is far enough away that the grenade will arm. I have an acquaintance who shot a Vietcong in the chest at 12 feet with one. The grenade knocked him down, but it did not arm or explode. That was the last time an M79 man was given point in that platoon!

The M79 grenade launcher is a really simple weapon to operate, and the best way to learn it is to shoot it several dozen times until you get the feel for it.

One amusing trick a lot of people apparently do not know about is placing the M79 butt on the ground. Then, using one man to load and the other to aim, fire, and open the weapon, you can fire the weapon and have 10 rounds in the air and on the way before the first one lands. This can be a very effective technique for guerrillas when harassing defensive installations. By the time the first one lands, the grenade team is leaving the area. Since it is a high-trajectory weapon, you can fire from behind a hill and over it to the enemy position and be sheltered from direct-fire weapons.

Despite its many good points, the M79 required a dedicated operator. No one liked this feature, and it was only tolerated in Vietnam until something better came along. That something, of course, ultimately was the M203 grenade launcher, which can be mated to the M16A1/2 rifles (as well as others). Once that system came on line, the M79 soon disappeared from the inventory, a weapon of short life, but one representing a very important development and advance in infantry-, squad- and platoon-level firepower.

M16, M16A1, M16A2, XM177E1/2

In the late 1950s, Eugene Stoner began developing his concept of a lightweight infantry rifle. He was attempting to use modern plastic, aluminum, and other alloys to give the infantry soldier a lighter weapon with greater capacity than existed at the time. My first exposure to the weapon then called the AR-15 was in an article in a 1959 *Guns* magazine that described the testing of the weapon. I remember seeing a picture of an 11-year-old shooting the rifle from a supported foxhole position and wishing it were me. I was 10.

I watched as the weapon was developed, and when Vietnam began heating up, U.S. advisors were originally allowed to bring their own weapons. The choice of many was the AR-15 rifle, presumably in selective-fire mode. Glowing reports were heard of the lightweight, reliable weapon. I wanted one but could not get one until Colt started making semiautomatic versions. I purchased the first one in my area, getting it, I believe, in 1965. Ammunition was hard to come by in those days, but I finally managed to get 1,000 rounds of white-box ammunition with the lot

Although the author does not think the M16 is as well made or well designed as the AK-47, it is clearly a weapon to be reckoned with, and anyone serious about military weapons in the late 20th or early 21st century should be familiar with both its strong points and its weaknesses. Here, the author holds the M16A1 rifle fitted with an M16A2 top half and Elcan scope.

number scratched off at $70 for a thousand rounds. Military .30-06 was going for $40 a thousand at the time. I hoarded my ammunition and shot my rifle. It came with triangle-style forearm, an open-style flash hider, a 20-round magazine, no bolt-closing device or butt trap, and weighed 6 1/2 pounds. It was a nice weapon. Over the years, I have put many thousands of rounds through it without any problem, and only the introduction of the SS109 round caused it to go into early retirement.

The M16 rifle, of course, is merely the military term for the AR-15. I remember seeing M16 rifles at Ft. Benning in 1968 being marked AR-15 so when we speak of one we are speaking of both. The Colt semiauto version was called the Comanche when I bought mine. They call it something else now in these ethnically sensitive days.

The main benefit of the rifle has always been its light weight. The big drawback has always been its lack of power. Everybody always likes a lightweight weapon. Early versions all weighed 6 1/2 pounds. Later as they added bells and whistles on them, they went up to 8 pounds. Current examples have a chromed chamber (an excellent idea given typical GI maintenance), and 1-in-7 inch twist to shoot SS109 ammo, a rounded handguard (I like it better), a long buttstock (short was OK by me), a bolt trap in the stock (I like it, but later AR-15s already had it),and much better sights (I like them, but wonder how they keep the GIs from playing with them). Current examples all use the 30-round magazine that became standard on the XM177E1/2, but, of course, the same magazine can be used in all weapons.

The carrying handle gives the M16 rifle its distinctive look. Early prototypes had a cocking handle inside the carrying handle, looking much like an upside-down trigger. This was later changed to the charging handle we are familiar with today. I have never cared much for the carrying handle idea, because I do not carry my rifle like it is a suitcase, preferring to treat my rifles like babies and cradle them in my arms. It also causes you to have a high position for your head, although I suppose it helps with the straight-line stock and recoil absorption. I think you could get the same effect if you kept the stock the same but lowered the sights and made them more conventional.

As it is, the sights are rugged anyway. The first-generation sights consisted of a rotating cylinder front and a rear that could be adjusted only with a bullet tip. Neither was particularly easy to adjust but, once set, seemed to hold. Because the front sight was rounded, it was not ideal for shooting purposes because you did not get a good square view of the sight, but it was

U.S. soldiers deploying in Vietnam with the XM177E1 and an early version of the M203 grenade launcher.

satisfactory at least out to 300 yards, which is really about as much as you can expect from M193 55-grain .223 ammunition. The second-generation guns have much better sights. The front sight has a flat blade that gives a better sight picture.

The rear sight is easier to adjust and has more adjustments. Otherwise the appearance of the peep is the same. Neither weapon has a proper night-sight capability because such sights do not come standard with this rifle, as they do with the Galil. The M16 night sight uses a replacement front post that has to be turned to expose it. That means all of your rounds will be off except at very close range. I know it is nighttime and the targets are close, but I do not like that remedy. Additionally, any time you expect people to move sights when the sun sets, you are asking for trouble.

The first-generation guns had no butt trap in the stocks, but experiences in Vietnam soon caused that to change, and a butt trap was evident by 1968. New guns not only have a butt trap but are longer and made from a different plastic material to avoid breaking. M16 stocks are never really strong enough in my judgment, and I have seen more than a few broken. Once broken, the rifle is deadlined until repaired because of the buffer system in the stock. I realize that FAL rifles have a buffer in the stock as well, but the stocks are stronger and the buffer smaller

Cutaway views of the right side of the M16 rifle.

than on the M16. Take care if you dive to the ground and try to break your fall with your stock when using an M16. Tricks you can do with ease with an M14 leave you holding parts with an M16.

The pistol grip is handy on both versions, although the new one is grooved on the back and has a finger groove. Unfortunately, the safety is still only located for right-handed shooters. On the later developed AR-18, it worked from either side, and with the integral case deflector built into the second-generation gun it is apparent that the left-handed firer was considered, but unfortunately they failed to change the safety. Both versions have the trigger guard system that can be folded down to allow firing in winter conditions. Aftermarket guns frequently do not, leaving me to wonder whether they have thought about mittens.

Early versions of the M16 did not have a device to seat cartridges that failed to fully chamber, but the later guns of both generations do. Frankly, I have doubts about the wisdom of cramming a cartridge that does not want to go into a weapon. Perhaps trying another cartridge or cleaning the chamber would do better. Of course, you do not have to use this seating device. I always have ignored them on my rifles.

Second-generation guns have a heavier barrel, at least in front of the forearm than do first-generation guns. Under the forearm, the barrels are the same because all are required to accept the M203. Many target shooters complain about that, but I like the M203 and am always happy to have one on my rifle. The extra weight out front is nice to have on the target range, but frankly I would be just as happy with less rifle weight and more ammo when in the field.

The big difference between the generations is the barrel twist: early guns used 1-to-12 and later guns 1-to-7. The faster twist is needed to stabilize the heavier bullets. You can use M193 ammo in the 1-to-7 guns (although it is not best), but you cannot use SS109 ammo in the 1-to-12 guns. This is a real problem because many military units throughout the world have the early M16A1 rifles, and in a crisis keeping the ammunition straight will be a difficult job.

Despite the plastic forearm and heat deflector, both rifles get hot after firing 100 or so rounds. I have found that 200 rounds get mine to the point you cannot hold it. An obvious (when you think of it) but often overlooked trick is to hold the forearm farther out away from the chamber because the forearm gets hotter the closer you are to the chamber. I have never seen an M16 handguard melt, but a continuous burst using a 120-round drum will turn the gas tube cherry red and sometimes on the shortened versions blow it up from gas pressure buildup. Perhaps this is not a tactical concern, but it clearly shows the weapon's limits.

Flash hiders on the weapons differ, depending on the generation. Early first-generation guns had an open flash hider with prongs. They broke up the flash quite well, but GIs apparently snagged them on vines and used them to break up the steel bands on ammo cases, bending the rifle barrels accordingly. My feeling has always been that any person who would use his rifle barrel as a pry bar would drink bath water, but nobody should ever underestimate the average soldier's ability to break things. Later flash hiders had a lip around the end to prevent both problems. Second-generation guns have a flash hider that is solid on the bottom, more to prevent released gases from kicking up dust than to be a muzzle brake, although it may have that effect also.

As a semiautomatic rifle, the M16 is quite good. It is light in weight, balances well, is not too long, and is quite adequate (once debugged and as long as proper ammunition is used and maintenance performed). It probably is not the best caliber in the world, but the ammunition is light. The magazines are known to have problems (ammo reversing itself while being fed is the most common thing), but this can be avoided by watching where you drop your magazines and discarding all questionable ones.

It is as a machine gun that the M16 is a bust. It claims a cyclic rate of 850 RPM, but in actual tests on a PACT meter, you get closer to 1,100 RPM. This is simply too fast for a shoulder-fired, rifle-caliber, full-auto weapon. If you want hits, you should stick with semiauto. Except at extremely close range (50 feet or less), full-auto fire with the M16 does nothing but waste ammo. In an attempt to solve the problem on the M16A2 rifle with technology, designers went to a three-shot burst device. Unfortunately, they went to the wrong design. First, three rounds must be fired before it resets. This means if you fire one round and stop, when you next pull the trigger, you will fire two rounds, not three. And if you fire two rounds initially, then the next shot is one. Better burst devices reset to three no matter what was done on the prior

burst. Worse, however, is that the burst group destroys the semiauto-trigger action. The first shot on semiauto will be 5 pounds; the next shot, 8 pounds; and the third shot, 11 pounds. Then back to 5 pounds again and the cycle continues. Nobody can shoot a rifle with such varying trigger pulls with accuracy. The trigger pull on any M16 is not great, but on the M16A2 it is downright bad. The average soldier in World War I had a rifle that was much easier to shoot accurately than the soldier in the 1990s has with an M16A2 rifle. You can only do consistently good work with a rifle if you have a good trigger.

Once the M16 became common, there was a move to shorten it. Unfortunately, because the recoil system was in the butt, you could not do much that way. Folding stocks were out. Instead a collapsing unit was made. At the front, the barrel was first chopped to 10 inches (the XM177E1); later concerns about malfunctioning and noise led to it being lengthened to 11 1/2 inches (the XM177E2). Because these were unusual looking, people naturally wanted one. When I worked as a federal law enforcement agent, I managed to grab one and used it for my car gun (an XM177E1 model) for the years 1976 to 1977. Actually, the collapsing butt was not as good as the fixed stock, and the shortened barrel merely reduced velocity and its effective range. Because it had a big flash hider on it, all I gained was perhaps 6 inches in the front and 2 in the back. It was neat, however. But looking back on it, I would have done better with a standard M16.

The manufacturer has not stood still since the Vietnam War ended. The new M4 carbine has a 14 1/2-inch barrel, so you get all the benefits of the XM177E1/2 without the long flash hider. Also, because the barrel is longer, you get better velocity. The 16-inch version is available for those who live in the United States and who wish to avoid federal entanglements. I find both versions to be quite charming (especially the one with the fixed stock) but perhaps, again, only because they are unusual. As a practical matter, my preference is for the standard AR-15A2 (a semiauto-only version of the M16A2, thus avoiding the three-burst system and its damage to the trigger) coupled with an M203 grenade launcher. You get a very satisfactory rifle and the ability to pitch grenades out to 400 yards. Quite a weapon.

The M16 and its descendants are likely to be with us for many years. Although I do not think it is as well made or well designed as the AK-47, the M16 is clearly a weapon to be reckoned with, and anyone serious about military weapons in the late 20th or early 21st century should be familiar with both its strong points and its weaknesses.

AR-18 (AR-180)

After developing the AR-15 as a small-caliber counterpart to the AR-10 7.62x51mm NATO battle rifle and finding it to be successful, the Armalite Company decided to simplify the manufacture of the weapon. Apparently, the company's thought was that there would be many countries that would like to make a 5.56x45mm battle rifle but who would not have the manufacturing expertise to use the aluminum called for in the AR-15 receiver and would not want the problems associated with aluminum receivers and steel bolts. Armalite developed first the AR-16, which was a 7.62x51mm NATO weapon and then the AR-18 in 5.56x45 mm. Later, for the U.S. market as well as overseas civilian sales, Armalite developed the AR-180, which is a semiauto version of the AR-18. I have never shot an AR-18, but I have shot the AR-180 extensively. Because they are the same weapon, except for the full-auto capability, I believe I can fairly comment on the weapon.

In my opinion, the AR-180 has a number of features that are actually improvements over the AR-15 rifle, and it was only an unfortunate series of events that caused the AR-180 not to be more widely sold. Armalite had very little manufacturing capability and had sold its AR-15 design to Colt. Colt

The AR-15/AR-180 is better than the earlier AR-15 rifle and as good as many 5.56x45mm rifles made today, but was not widely used for a variety of reasons. The square handguards on this AR-180 were more comfortable than the pyramid style found on early AR-15/M16 rifles.

naturally was pushing the AR-15, and the weapons (then known as the M16) were beginning to enter the U.S. inventory. Once that happened, Colt obviously had an advantage over the competitors because of familiarity, spare parts, and training, if nothing else. Armalite sold the right to manufacture the AR-18 and AR-180 to a Japanese firm. During the Vietnam War, the Japanese firm was prohibited from selling weapons of war to combatants by Japanese law. Thus, the design was effectively not available to U.S. forces. Later, the design was made by the Sterling Company of England, but by then the M16 was firmly entrenched. Plus the nations in the world not supplied by the United States were awash in AK-47 rifles at giveaway prices. Countries that were not pro-Communist who wanted a 5.56x45mm rifle either developed their own version to be made at home (as did the Italians, Israelis, French, Belgians, British, and Swiss) or bought (or were given) U.S. weapons from the foreign military sales program. This meant the M16. Thus the AR-18 died and never got the respect that might have been anticipated. Possibly its most famous use has been in Northern Ireland, where a substantial number of AR-180 rifles purchased in the United States and smuggled into the country have been used by the IRA with deadly effect. One would suppose that these AR-180s will be encountered by British troops well into the 21st century, given the fact that well into the 1980s they were still encountering M1921 Thompson SMGs smuggled in during the 1920s.

With the AR-18, Armalite attempted to avoid many of the design flaws of the AR-15 and to make it cheaper and easier to manufacture. To a remarkable degree it was able to do this.

The first thing you notice about an AR-18 is that it lacks the high sights and carrying handle of the AR-15. This is all to the better, since it allows the shooter to get a faster sight picture. The front sight has a good set of wings to protect it and uses the same type of post found on the AR-15. Adjustments are also identical. The rear sight is also well protected, but due to the knobs available, corrections are easier to make than on the AR-15. The carrying handle on AR-15 is unnecessary and really reflects a defective design philosophy. The front sight on the AR-15 is only there to accommodate the high front sight. The sights on the AR-18 are better from the rifleman's standpoint.

Unlike the AR-15, the AR-18 has a traditional cocking handle. Although located on the right side, it is angled enough to permit it to be pulled to the rear by either hand without difficulty. Also, unlike the AR-15, you can use it to push the bolt home (the AR-15 needed a bolt-closing device to do that, and you still do not get the same pressure), or, more important, you can use it to extract a cartridge. As someone who has had to kick

Right-side view of the AR-18/AR-180 5.56x45mm rifle showing good safety/selector design, dust cover, and bolt handle design that permits cocking with the left hand without breaking. The firing grip and low mount to telescopic sight distinguished this design from that of the AR15/M16 rifle until the most recent redesign approval.

the bolt handle on an M14 to remove a fired case and rechamber a fresh round, this is a feature I like. Putting the rifle on the ground and kicking the bolt handle will free stuck cases frequently, and it is my experience that sooner or later with all self-loading rifles, you need to do this if you fire them enough under dirty conditions. Try kicking the bolt on an AR-15 and see what I mean. You can only pull the charging handle back and frequently this just will not do it. Then you need to hunt up a cleaning rod to push the case out—this is not the best approach. I like bolt handles.

The pistol grip on the AR-18 is just the same as on the AR-15, but the AR-18 has a safety/selector system that works from either side. Thus the left-handed shooter can remove the safety and select the mode of fire as easily as the right-handed shooter. All serious battle rifles should have such a system.

The magazine catch on the AR-18 is similar to that found on the AR-15, which is unfortunate from the standpoint of being able to use it with either hand, but at least it is adequate. The magazine is the same as the one on the AR-15, except for a small slot in the magazine that engages the catch. That is unfortunate for those of us who have access to a large quantity of M16 magazines because it would be nice to simply interchange them. Instead, you need to get out your Dremel tool and cut a slot in your M16 magazines to fit them to the AR-18. It is not a really involved project, and, of course, if they work in an AR-18, they will work in an AR-15 so you do not lose anything. Still, it would have been better to simply have used standard M16 magazines from the beginning.

Magazines always seem to stick in the magazine wall, which slows up reloading. Whether this is because of tolerances that are too close (which would loosen up over time) my individual example, or the problem associated with an aluminum magazine encountering the steel walls of the receiver housing, I do not know. But on my AR-180 rifle, magazines always seem to stick and be slow to reload.

Although the grip is comfortable, it lacks a cleaning gear compartment and an area to store cleaning equipment. This is always unfortunate. The stock is quite rigid when it locks open and can be opened or closed quite simply. The stock feels much more comfortable than tube-type stocks, and it gives you a more compact package. It would be better if the stock were not black, which soaks up heat and makes it uncomfortable to

use in hot weather. Of course, you can paint it a different color, but this should not be necessary. Green, brown, or tan would be better camouflage than black, which is always quite distinctive, and such colors are much cooler to use.

The handguard is much more pleasing to use than the triangular handguards found on early AR-15 rifles. It was not until the M16A2 was developed that similarly shaped handguards would be adopted for that rifle system. The AR-18 had them almost 20 years earlier.

With its butt folded, the AR-180 is a smaller package, and it has no springs to break in the butt as does the AR-15/M16.

The flash hider is similar to that found on early AR-15 rifles. Had the AR-18/180 been more widely used, the closed flash hide would have been adopted. In any event, the threads are the same, so it can be easily changed.

The AR-18/180 is a nice, light, well-balanced rifle. Because it was made by a number of manufacturers, quality may differ. I am only familiar with the original Costa Mesa weapons made by Armalite. Those weapons proved to be reliable and accurate weapons within the limit of their sights and trigger pull. It is unfortunate that the AR-18 was not promoted more seriously. It was better than the earlier AR-15 rifle and as good as many 5.56x45mm rifles made today.

M21—7.62X51MM

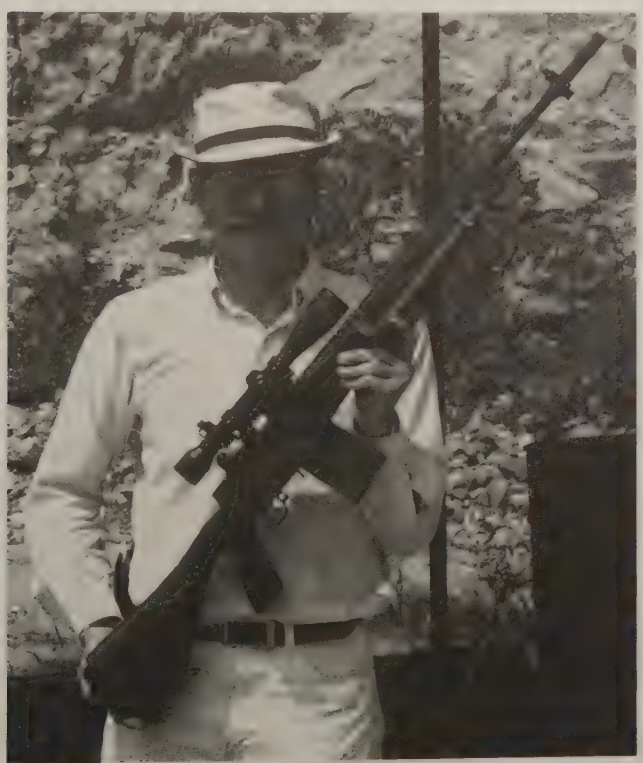
The M21 rifle was the best sniper rifle to come out of the Vietnam War. Basically, the M21 consists of a match-grade M14 rifle fitted with a 3x9-power ballistically compensating scope. The rifle I tested was fitted with an M14A1 stock and included the bipod typically fitted to the M14A1 rifle. As such, the weapon was slightly heavier than a typical M21 rifle, but otherwise it was a standard model, including the selective-fire feature.

The M14A1 stock is quite handy for use as a squad automatic weapon but is not nearly as fast as a standard M14 stock for snapshooting. For the purposes of the M21, however, it was (if anything) better than the standard M14 rifle stock. I fired the weapon using the bipod, but if I had actually been shooting the weapon at extended ranges (which I was unable to do on the day in question), I would not have used it because the use of a bipod will cause groups to shift a bit.

The two key elements in the effective use of the M21 in combat in Vietnam were the use of M118 National Match ammunition and the ballistically compensating scope. Good National Match ammo is hard for nonmilitary shooters to find. Much of what is encountered at gun shows is old stock, and it cannot be expected to fire groups of the same quality

today as it was capable of in 1967 when it was made. The key problem seems to be dried-out bullet sealant, which causes uneven pressure on the cartridge neck area. However, really good National Match ammunition is nearly as good as Federal Match ammunition, and that ammunition will do one-quarter minute. Even doubling that to one-half and you will see that you have ammunition capable of dealing a lethal blow at long range.

Good ammunition is one thing, but hitting a target is a combination of at least three other factors: mechanical, human, and one that is typically human but can be made mechanical. First, the rifle must be accurate. Long experience at making M14 Match rifles had allowed the U.S. Army to reduce the group size from 2 1/2 inches at 100 yards to 1 inch at the same distance. Hence, the first mechanical block had been overcome. Second, the shooters had to be capable of using the weapon properly: they had to know *how* to shoot, and military snipers had to know how to use fieldcraft. The army had a large enough pool to draw from so that capable snipers could be obtained. The last point was one that ordinarily is human, but thanks to the development of the ballistically compensating scope, it became mechanical. Estimating range is the biggest difficulty long-range shooters have, and it is something that takes a lot of skill and experience to master. Further, the skills rapidly decay. Today, we have simple laser range-finding equipment but nothing of that type existed in the 1960s. James Leatherwood, however, developed a ballistically compensating scope mount that allowed the shooter to bracket the target and raise the POI as he did so until it would be possible to aim straight on even at distant targets. The ballistic compensator was calculated to go between 300 and 900 meters. That range was enough for the M21 because the rifle could hit a man at the last mentioned range, and the .308 cartridge could still deal a deadly blow. For targets beyond 900 meters, traditional range-estimation practices were necessary.

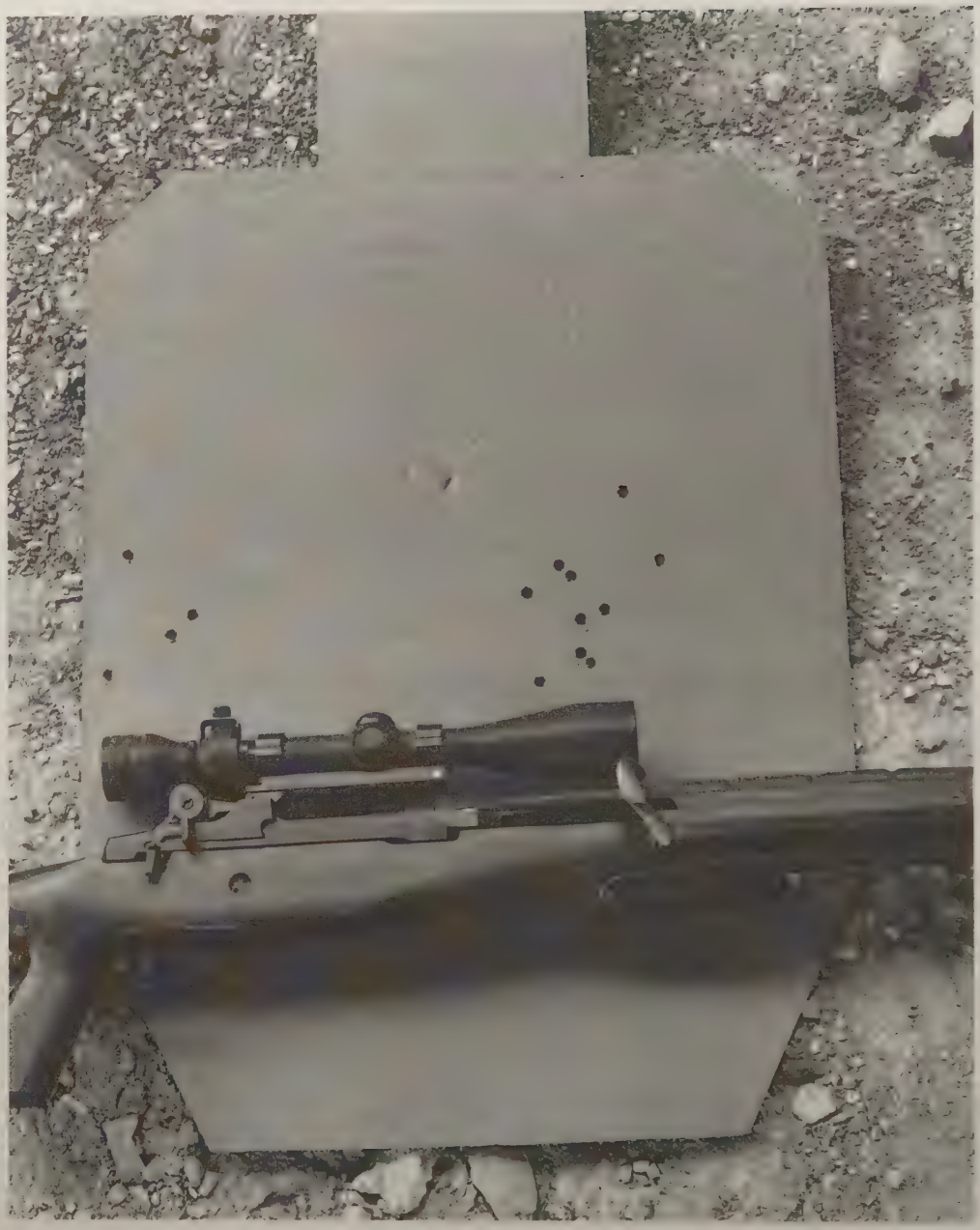


During the Vietnam War, the M21 showed its stuff by far outdistancing anything the enemy had and bringing the semiautomatic rifle into serious consideration as a sniper rifle for the first time. Here, the author holds an M21 fitted into an M14A1 stock.

The M21 was equipped with a selector, and stories were told of snipers shooting their way clear of ambushes because of this feature (although I believe it is more useful in the semiautomatic mode). One of the typical problems associated with conventional sniping rifles is the limited ability to fire rounds quickly. Frequently, they are slow to reload and are bolt-action weapons. The M21 could be loaded with a spare 20-shot magazine and was semiautomatic as well as fully automatic, which meant the sniper was no longer a weak element with very little firepower. Instead the sniper had good firepower and could be expected to turn the telescope down to 3X and then battle his way from an ambush with accurate and quick semiauto fire or even full-auto fire if essential. This was a definite improvement, and the loss

of fine accuracy sustained by going with the M21 rather than a traditional bolt-action was not great enough to outweigh the benefits.

In actual shooting tests, the M21 had the typical trigger of a decent M14 Match rifle. It is still a two-stage trigger, but crisp and about 6 pounds. The scope is clear and bright although not as good in that regard as some recent police scopes I have seen. The reticle is somewhat more involved than the two-step reticle on an original Leatherwood scope mounted on an M21 I shot in 1971 while in the army, but it is not as cluttered as the ones encountered on many European sniping rifles. Accuracy is about what you would expect at less than one MOA, but I did not get a chance to shoot this example at 600 yards or more, which I would have preferred. Almost any rifle is suitable when properly scoped for man-targets at 400 yards, but when you go out to 600 and then to 1,200 yards, you begin getting into the area where a real rifle and real ammunition shot by real shooters is needed. This is where the M21 comes into its own—although, admittedly, beyond 1,000 meters it is really on somewhat shaky ground in comparison with dedicated bolt-action rifles, especially a rifle shooting a more substantial cartridge than the .308.



This target reflects the results of 20 shots fired by the author at 25 yards in two-shot bursts with the M21 rifle off a bipod. The first round hit center, and the second round went to the same level but to the left edge.

During the Vietnam War, the M21 system

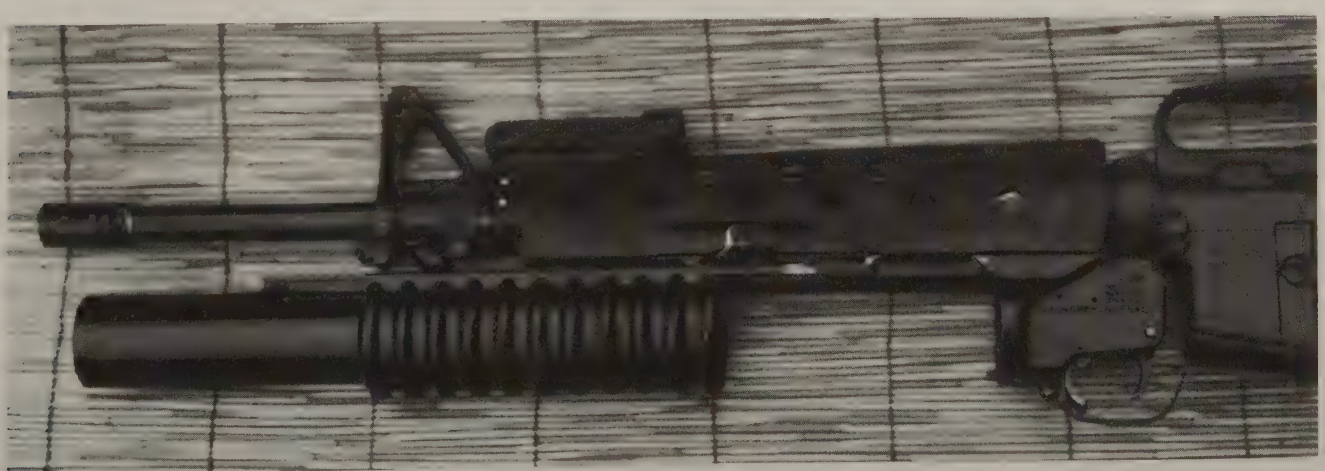
showed its stuff by far outdistancing anything the enemy had and bringing the semiautomatic rifle into serious consideration as a sniper rifle for the first time. Until the M21 came along, no one seriously thought a semiautomatic rifle could be used for such a purpose. Thereafter, any new sniping system had to be judged in light of the M21 because it became the new standard for serious sniping use.

M203 GRENADE LAUNCHER

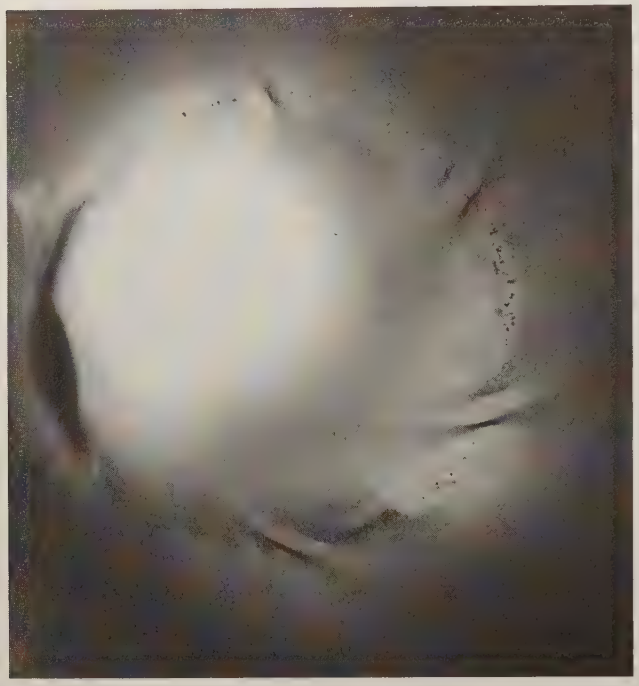
The M79 grenade launcher was one of the big hits of the Vietnam War. In fact, the only thing bad anyone ever said about it was that it required a dedicated soldier, thus reducing the squad's firepower by one rifleman for each grenadier. Almost immediately after it became apparent that the 40mm grenade launcher was a good weapon, attempts were made to attach the launcher to a rifle. Various prototypes were designed and field-tested. By the end of the Vietnam War, launchers that could be slung under the barrel of the M16A1 rifle had been created and were field operational. From these last prototypes came the M203.

This is a weapon that is virtually absent from the field except in the hands of U.S. forces or its allies. This launcher is attached to the underside of the M16 rifle. It is a single-shot unit like the M79, but by using the upper barrel for sighting and the M16 rifle's actions, the actual launcher is lighter than an M79. With the launcher added to the M16A2 rifle, an 11-pound package is created, but the combination of an M16A1 rifle with an M203 grenade launcher is a wonderful infantry weapon. The squad does not lose a rifleman, and yet the M203, in properly trained hands, can be fired as effectively as the M79. The sights on the M203 are of two types. The first is the simple pop-up type used for rough field firing calculations. An individual who has enough experience using these sights can get good point results up to 150 yards. The other type of sights is much more useful because the range increases but is much more complex and involved to use.

There are a few things worthy of special note when discussing the M203. I do not believe you can fire the M203 as fast as you can the M79 because of the construction of the unit, which requires you to (1) push the lever in, (2) push the barrel forward (kicking out the empty and allowing the new round to be inserted), (3) pull the barrel back (locking it in place), and (4) pull the trigger. On the M79, you merely (1) push the lever on the rear of the receiver with the thumb, (2) pull the barrel down (kicking out the empty), (3) stuff in a new round, (4) flick your right wrist (closing the barrel) and (4) fire. Experience



The barrel of this M203 grenade launcher is in the forward (or loading) position.



The slow twist of the M203 40mm barrel.

tells me that the M79 is 20 percent quicker at a minimum. Also the M203 cannot be used as a substitute mortar as readily as the M79, a feature I always liked on the M79. But despite these problems, the M203 is better because it allows you to have your launcher and a serious rifle at the same time with very little extra bulk—and you can shoot them at the same time.

The M203 has a lightweight rifled barrel that throws the 40mm grenades just as well as the M79 tube does. There is a heavy rubber handguard on the barrel. This becomes a useful feature when a few rounds have been fired, plus it gives a much better grip to the shooter. The safety seems quite positive, and I would not hesitate to carry a round in the chamber and cocked with the safety on. It blocks the trigger until it is removed, thus reminding the soldier that the weapon is still on safe by mere feel. The weapon has no pistol grip itself, but the M16's magazine well and magazine are used as the grip.

Although there have been attempts to develop other types of launchers for NATO battle rifles, all have been unsuccessful because of the lead in both design and production that the M203 has. The M203-M16 combination is excellent, and were I to take the field today as an infantry officer, that is what I would carry.

M40

During the Vietnam War, U.S. sniping came out of the slumber it had fallen into after the Korean War. World War II and Korean War-era sniper rifles had been beaten in the field and found to be lacking spare parts and good ammunition—as well as being way behind in terms of technology. Therefore, the U.S. military began developing new sniping rifles. The army chose the M21, which was basically a National Match model fitted with a Leatherwood scope, and the marines went to the M700 Remington equipped with a variety of scopes. Naturally, there were a bunch of missteps and sideways steps on the road to rebuilding the sniping programs, but ultimately a variety of good, dependable rifles were developed that, coupled with high-quality National Match ammunition and well-trained and motivated sniper produced very good results.

These developments continued after the Vietnam War, especially on the Remington M700, and eventually led to the M40 and M40A1. Both rifles are based on the M700 action, chambered for the .308 (7.62x51mm NATO) round, and use high-quality custom barrels, good optics, and fiberglass stocks.

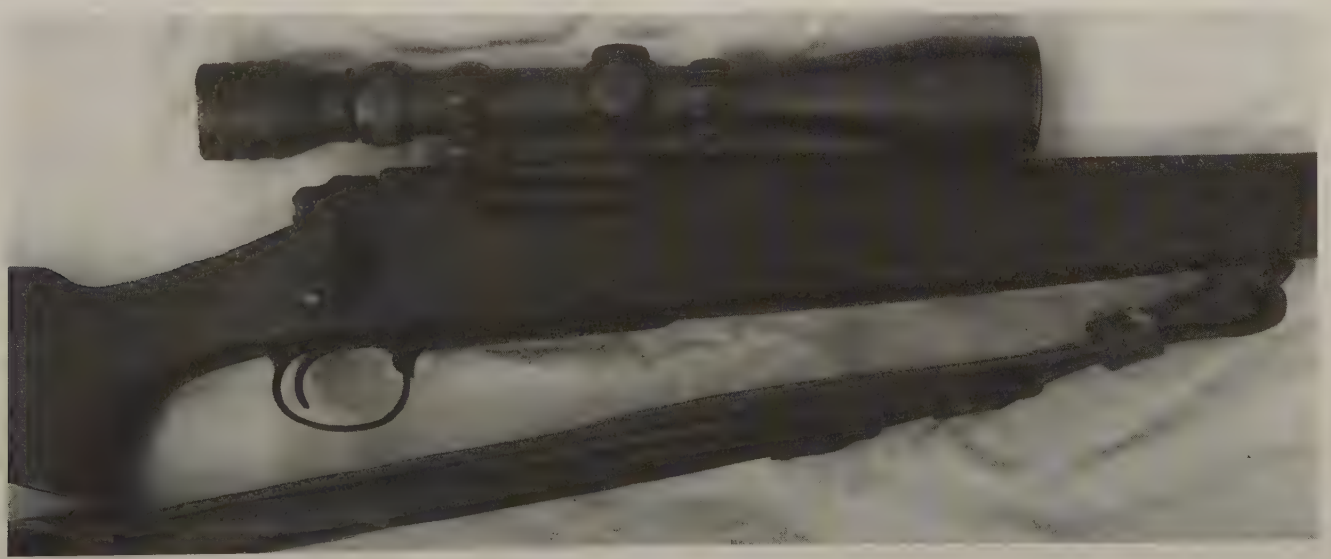
These rifles shoot fine, but they are often difficult to maintain in the field, I understand, most likely because they basically have a commercial rifle action converted to military use. I found them to be rather ill balanced because of the heavy, long barrel; as a result, shooting from the off-hand and kneeling positions is difficult. The problem was absent in the sitting or prone shooting position.

Both rifles totally depend on scope sights and are worthless if the scope is knocked out or destroyed, except for very close instinctive work. A real military (as opposed to police)

The author with the Remington M40A1 sniper rifle.

sniper rifle should be equipped with some type of iron sights so that it can be used as a conventional rifle, if needed. Additionally, although the scope mounts seem stable, they cannot be removed in the field. This always makes maintenance more difficult, although admittedly you do not generally want to remove a scope from a sniper rifle in the field. Neither scope includes any laser range finding or automatic ballistic compensation, although I would think that such things were technically possible now and would be included on any rifle fielded by a first-class military. If the U.S. Air Force used the same level of technology in their planes as the army and marines display on their sniper rifles, they would be flying late 1950's-style planes. You can imagine how long they would last in battle with a first-class enemy, although they might be acceptable for back-country guerrilla warfare.

The biggest problem encountered with both rifles is their lack of capacity and reloading. Neither can use detachable magazines or even stripper clips. Both require the shooter to load one round at a time into five-shot integral magazines. This is totally unacceptable. My M700 Remington was converted to accept M14 magazines, thereby giving me 20 shots without reloading and the



A close-up view of the right side of the scope on the M40 sniper rifle.

capability of switching ammunition instantly plus reloading more quickly. There is no acceptable reason for the military sniper rifle not to have the same thing. A little less barrel work and a detachable magazine system would be improvements.

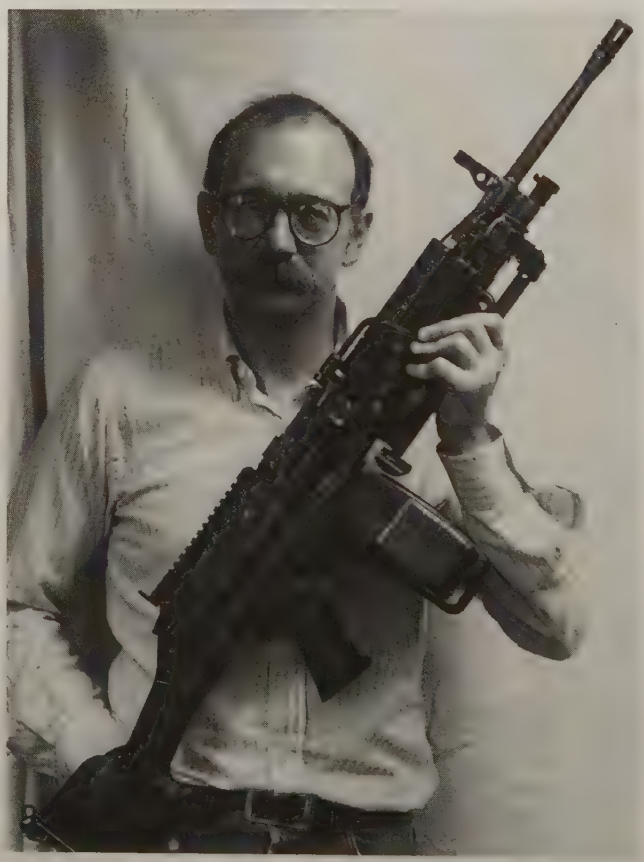
Finally, the trigger guard is the standard commercial type. The military sniper rifle should have a larger trigger guard to permit a mittened hand to use it; the sniper may need to sit motionless in extreme climates for long periods. In the hunting field, movement may lose you a trophy, but even the most aggressive game animal does not call down artillery on you, as can happen to the sniper who is discovered.

Although the M40 and M40A1 both have excellent optics and would make very fine deer rifles for anyone who is willing to put up with the weight, as military sniper rifles they lack quite a bit. Accuracy is not the only trait with a sniper rifle. Lots of rifles are accurate, and many are accurate all the time. A proper military sniper rifle will be called upon to perform many functions that the commercial sporter or police sniper rifle will never encounter. Additionally, the military rifle will get more wear on one tour than most commercial sporters do in an entire lifetime. Police rifles get used even less than the hunter's weapon typically does. Seasons are short and police hostage situations seldom occur, one is thankful, but the military sniper may very well be in action for weeks on end. For a country that can deploy the Abrams tank, the laser-guided bomb, and the Tomahawk missile, the M40 and M40A1 show a lack of commitment to the needs of the military sniper.

M249—MINIMI

What has been missing from the U.S. Army and Marine infantry squad since the M14 replaced the BAR is a proper base-of-fire weapon for this smallest of infantry units. You simply cannot use a LMG, such as the M60, because it is too heavy, and a rifle (even if modified quite a bit, as happened with the M14A1) will not suffice in this role. You need something that can be readily carried over broken ground yet offers a high volume of accurate fire. It is also nice if it does not use belts until it comes time to be in a static position; then belts are good for continuity of fire. Anything that uses a belt should have a detachable barrel to preserve the continuous, long-term fire that belts provide. Naturally, with all of these points you must have a weapon that is extremely reliable and soldierproof. The ammunition must be light to carry and strike a hard blow at some distance.

Although opinions may differ about the desirability of the 5.56x45mm cartridge and its lethality and stopping power, there is no



The author with a product-improved (PI) M249 machine gun. Note the new stock design of the flat top to hold the Elcan scope or night sights. The weapon is fitted with a 200-round box magazine unit.

use denying its availability. Any squad-level weapon must use a cartridge that is in common use already, even if another cartridge might be better ballistically. The goal of a military is to limit the number of cartridges in the inventory, not expand it. The Minimi, or M249 as it is called in U.S. military circles, does all of these things.

The Minimi may be the single most reliable weapon in the U.S. inventory today. John Ross, a friend of mine who has two of them (one pre-May, a keeper, and one post-May, a blaster), has fired tens of thousands of rounds through his without any failures, and none of my students in the Special Response Teams training classes I conducted for the army ever reported any problems with the Minimi. Glowing, enthusiastic reports are commonplace.

I like the weight of the weapon. Although it fires only in the full-auto mode and fires from an open bolt, the weapon with a 30-round magazine in it weighs little more than my M16-M203 combination, which is currently my favorite infantry weapon. I can shoot it from the off-hand position like a standard rifle, as well as from all the other typical positions used with an LMG. Although the 200-round box of ammunition in its plastic box will clip to the gun, I find this to be somewhat awkward to carry, but you can use M16 magazines instead. With them inserted, you can carry the weapon on patrol all day with little more fatigue that if you used an M16A2 rifle. Naturally, you do not get the continuity of fire with the 30-shot magazine, but it beats the cheater belts I used with the M60 in the army and keeps the ammunition fresh when walking in wet weather. Use the magazine for carry and only insert the 200-round box when you are in a static role or are really tied down trying to slug your way out of an ambush.

The M249 fires in full-auto only, and although the manufacturer claims 750 RPM, I do not believe it. When a PACT timer is put on one, there are more than 1,000 RPM with almost any ammunition tested and occasionally getting into

The top barrel of the PI M249 is covered with a handguard, unlike the old version on which the hand is likely to get burned.

the 1,200-RPM range. At that rate, single shots are very difficult and even three-shot bursts take some real skill. Fortunately, five-shot bursts are easy. The weapon comes with a nice safety, but as with any open-bolt gun, I do not trust it. I prefer to cock it when ready to fire and leave the bolt down on an empty chamber when walking with the weapon.

The sights on both the front and rear are quite good, although the recoil makes them blur when bursts are fired. The barrel can be quickly changed without touching it, which is fortunate because they get very hot very fast. No M249 should ever be fielded without replacement barrels, yet in Panama the U.S. military did just that. Plan on replacing the barrel every 200 rounds if you do not want to destroy it prematurely, and watch where you put it because they are really hot—much more so than a 7.62x51mm barrel after an equal number of rounds. In fact, I think two spare barrels for each gun would be a good idea. The handguard will protect your hand from burning, although it also gets hot after a couple of hundred rounds. Early weapons had no top handguard, so watch out. Most of the newest models come equipped with handguards, but I bet they will melt. The stock folds, and it is quite rigid. Keep it extended unless you are storing it. Do not try to shoot it with the stock folded or you will waste ammunition. The stock is a tube type, which is not the most comfortable type, but fortunately the recoil is slight enough not to make this a problem. The rear sight swivel is nicely placed to allow the weapon to be slung over the shoulder. This shifts the weapon weight from the shooter's hands to the shoulder.

In addition to firing in the unsupported position and with its bipod, the weapon can also be fired from M60 and MAG-58 tripods. Mounted on these tripods, it can be used to fire at distant targets because of the long-ranging characteristics and penetration of the SS-109 projectile. This weapon's accuracy makes it easy to hit chest-size plates at 350 yards from the prone position with a three-shot burst. If you use much more than three shots, you'll get a good beaten pattern around the target but no more hits, so try to use three-shot bursts. However, because of the speed of fire and recoil characteristics of this weapon, I frequently find myself shooting four- to five-shot bursts if my concentration lapses momentarily.

The best weapons to compare this weapon with are the Soviet-designed RPD and RPK. Neither of these Soviet weapons has a detachable barrel or sights as good as those on the M249. The RPK weighs the same as the M249, and the RPD is heavier by 4 pounds or so. The RPK is merely a beefed-up rifle, but the M249 is actually a purpose-built squad automatic weapon. It returns to the infantry squad what has been missing since the BAR M1918 was removed.

M4 CARBINE

Much has been written about the new M4 carbine. To those who have been around a bit, it looks a lot like the old XM177E1/2, except that instead of a 10/11 1/2-inch barrel fitted with a long flash/noise suppressor, the M4 carbine uses the standard flash hider and a 14 1/2-inch barrel. Additionally, it is rifled with the faster twist barrel to allow use of the new SS109 ammunition, and it uses the new heavy barrel diameter in front of the sights while offering the old tapered barrel under the fore-end. This is designed specifically to permit the mounting of the M203 on the M4 carbine. The rifle also uses a tube-type sliding stock that is sometimes used as an adjustment method by shooters when they are wearing clothing that affects their reach. Otherwise, the M4 carbine is identical to the M16A2 rifle. It uses the same burst-fire mechanism, which makes good semiautomatic work difficult, and the same replaceable-handle sighting system. Military testers have gotten the same results firing the M4 as with the M16A2, at least up to 600 meters. Its weight, length, and exotic looks make it quite popular among the troops to whom it has been issued.

Having been armed with the XM177E1

The author with an AR-15A2 carbine, a semivariant of the M4 carbine that is the same except for the selective-fire feature and the 14 1/2-inch barrel.

while in the army, I am quite familiar with it. I never had any functioning problem with my XM177E1, but many people who did not have a factory-made model reported many malfunctions primarily because of low gas pressure. When I tried a 14 1/2-inch barrel on my M16A1, I was pleased to see no malfunctions; similarly, the M4 carbine-length barrel should keep velocity high enough to be lethal and pressure high enough to ensure reliable feeding.

Although the sight radius on the M4 carbine is less than that found on the standard M16A2, it does not cause many sighting errors. When the M4 is coupled with the Elcan scope—which the flat top of the M4 and M16A1 simply cries out to have installed—the issue is moot. Although having 5 1/2 inches less barrel may cause velocity to suffer, with the current SS109, load it to be lethal and the short barrel should not limit its effectiveness on target. I do not believe that it causes a problem for targets typically encountered by rifles.

This AR-15A2 variant of the M4 has an Elcan scope mounted instead of iron sights. It also features an integral case deflector to make it easier to use the weapon from the left shoulder.

The sliding stock on the M4 is not as well made as the old one on my XM177E1, and, of course, the stock tube is still subject to breakage just as on a standard M16A1/2 rifle.

With the advent of bulky body armor and a wider physical range of soldiers than in the past, the ability to use a shorter or longer stock without doing anything other than slipping the standard stock forward or backward along the spring tube in the stock is a good feature. Unfortunately, this same feature means that the cleaning gear and rod, found with the M16A2 stock, are missing. Thus the field soldier will need to find some other way to carry his cleaning gear.

The safety/magazine release and bolt device are standard M16, and they are handy and quick to use.

Although the M4 weighs slightly less, the mass of the weight is between the hands, so the balance actually feels better. I find the M16A2 rifle slightly muzzle heavy. Such heaviness is acceptable for target work, but the M16A2 does not seem nearly as lively as might be desirable in the field.

Whether the M4 carbine will actually replace the M16A2 rifle is somewhat doubtful. I do think the adjustable stock has some definite benefits to be appreciated, especially given the increasingly different-sized bodies encountered in combat as well as the additional gear sometimes worn in certain situations. I also must say that the Elcan scope makes quite a handy sighting device and thus alleviates any short-sight radius problems that otherwise accompany the M4 carbine. Decline in velocity, however, is still a concern for me because the 5.56x45mm cartridge depends on velocity to be effective. Reducing the barrel length will always reduce velocity, and it remains to be seen whether such decrease in velocity will be critical in combat. The experiences derived from the Vietnam War with the even shorter XM177E1/2 models is not really applicable here because of the very short ranges typically encountered there and the small size of the typical Vietnamese soldier. The wars in Panama and the Persian Gulf did not call for the proficient use of small arms and thus do not really offer any instructive lessons. With a little luck, no one will ever learn the hard way. I know I would be reluctant to shoot a whitetail deer at more than 200 yards with a 14 1/2-inch-barreled 5.56x45mm, whereas I would consider it with a higher-velocity projectile (assuming that the caliber and weights were the same).

PART III

Helmets and Ballistic Vests

In days of old, knights wore their armor in battle and tournaments. As we approach the end of the 20th century, the soldier has once again taken up armor seriously.

In the days of knights, armor was designed to prevent cutting blows. The earliest armor was possibly heavy leather clothing. Being thick, it would turn or deflect the cutting edge of the period swords. After leather came chain mail. This was even better, but, of course, was much more expensive to make and maintain. Still, it would prevent a cut better than would leather, and when constructed and worn properly, it was surprisingly effective. Even today in meatpacking houses, the butchers wear mail-like gloves to prevent their hands from being cut when butchering hogs or other animals. Plate armor came along at the same time that chain mail was being used. People often mistakenly believe that armor was so heavy that the rider had to be lifted to his horse by winch. The complete set rarely weighed more than 75 pounds, and modern infantrymen carry more than that into battle. One English king was famous for his ability to jump on a horse without using the stirrups while wearing a full set of armor. Obviously, a well-trained and athletic warrior was not nearly as weighed down as many believe.

However, with the advent first of the long bow, then the crossbow, and finally gun powder, no longer was the knight well protected by his suit of plate armor. At that point, the armor was more burdensome than beneficial, and gradually plate armor fell out of favor. However, tests conducted in this century show that the plate armor worn by the Spaniards during the conquest of South America still could turn a lead bullet fired from a revolver. By the time the American Revolution took place, but for rare exceptions, armor was not worn by active combatants.

During World War I, the search again got under way for something that would stop bullets and yet could be worn by an individual soldier. Although plate armor was considered by both sides, generally it was a failure because it was unable to stop pointed, high-velocity rifle rounds. However, World War I also saw the development of massive artillery attacks, and military thinkers of the day had to address the obvious problem of shrapnel. Because shrapnel was not a high-velocity missile (it was generally irregular in shape, and it varied widely in weight because of the construction of artillery shells during the period), equipment experts theorized that it might be possible to protect the individual soldier's most exposed portions with steel light enough to be worn by active combatants. From this theory developed the modern steel helmet. In the early stages of World War I, combatants on neither side wore steel helmets, but soon these head protectors appeared on both sides of the battlefield. Such helmets would not stop a direct blow from a rifle bullet, but they frequently would stop a ricocheting round or artillery fragment that had lost velocity or was striking at an angle.

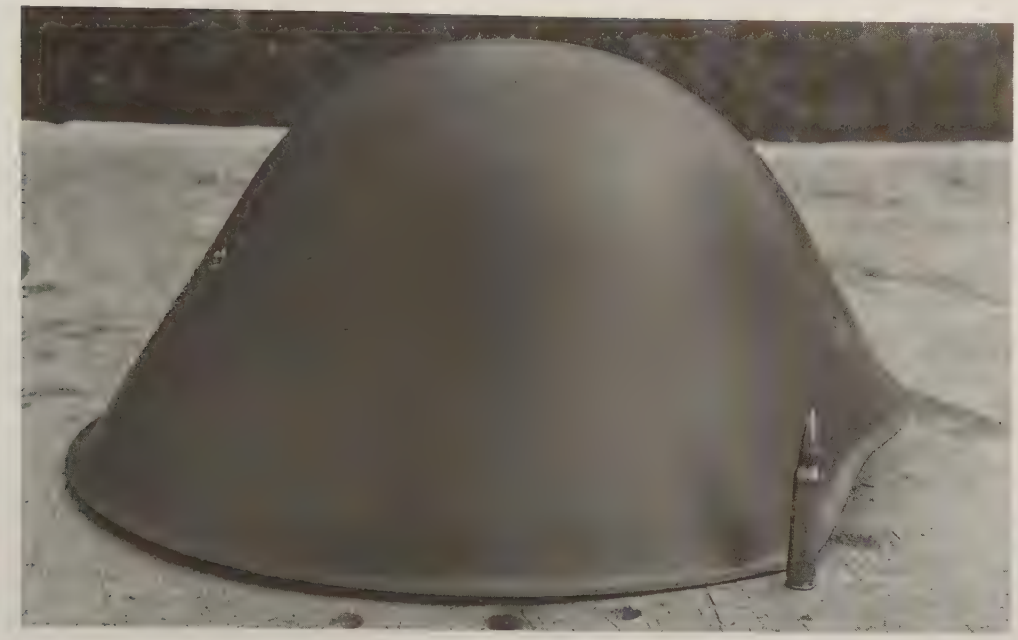
No one can tell exactly how many people

The East German combat helmet shown with 7.62x39mm Chinese ammo. There is no penetration at the rear of the helmet.

owe their survival to the development of the steel helmet, but logic tells us that the number must be significant. Any bullets or fragments stopped by the helmet had to be considered life threatening in the absence of such helmets. After the war, development in this field (although not an item of critical importance to the planners, as it was to the infantrymen in the field) continued, and World War I designs were modified to give better protection. Newer designs that provided even more protection were worn in World War II. Those designs remained in use well into the 1980s, with the differences in the various militaries' helmets being in style, not design. The infantryman's helmet I wore in 1968 was no different (except in shape) from the one my father had worn in World War I.

Cut off from the Asian stocks of silk and rubber in World War II, the United States developed a number of synthetic products to replace them. Soon it became obvious to military designers that nylon was a very strong yet light fabric. Somewhere along the line, it dawned on a planner that the material could be fashioned into body armor that could prove light enough to be worn in the field.

Body armor for U.S. forces began appearing late in World War II, but it was not widely used. During the Korean War, however, it was a common sight. Just as with the steel helmet, steel armor was not designed to stop bullets from rifles directed at the soldier, but rather ricochets or artillery fragments. Still, preventing a torso injury was an excellent idea, and Korea was a good place to use such armor because the climate was



East German combat helmet shot at 100 yards with SS109 5.56x45mm. There is total penetration front and back.

East German combat helmet shot at 100 yards with .308 armor-piercing ammunition. There is total penetration front and back.

cool enough for soldiers to wear the armor somewhat comfortably. To be effective, the armor had to be closed in the front, in effect encasing the upper torso in nylon. It was rather like wearing nylon hose, only the soldiers had to wear many thicknesses on the upper torso rather than a single layer on the legs. It was not exactly comfortable, but if the climate was such that the armor gave both warmth and protection, soldiers would wear it, as was proven in Korea.

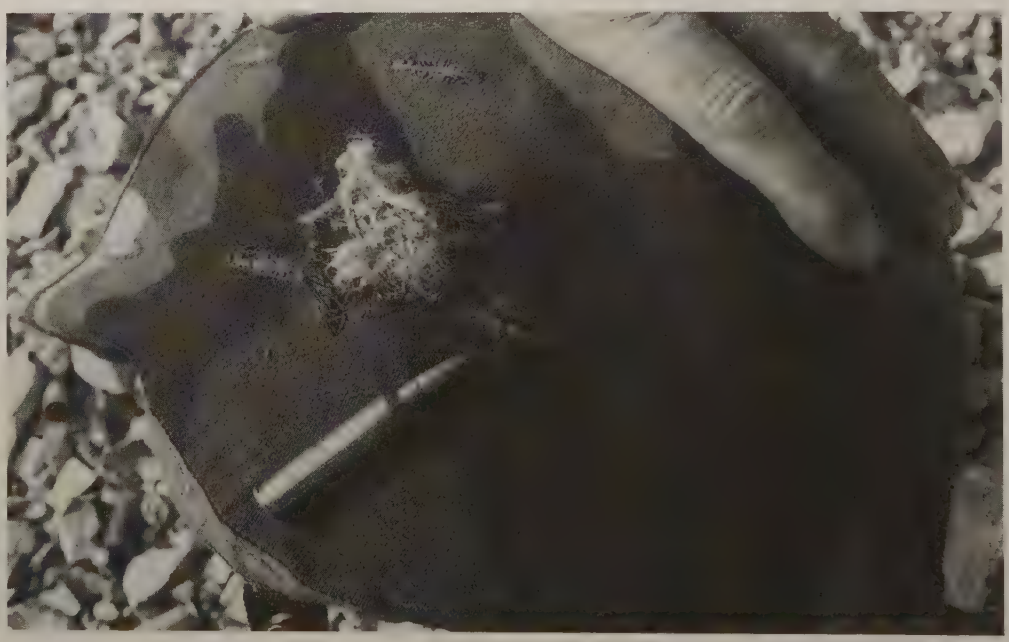
However, myths about these vests soon developed, and people began to think of and refer to them as "bulletproof vests." *They are not.* I tested one of these Korean War vests in 1965 and found that I could shoot through it easily with a .32-20 revolver cartridge. A vest might turn low-velocity missiles, but it is unlikely to turn the enemy's 7.62x54R, 7.62x39mm rifle rounds, or the 7.62mm pistol/SMG rounds. Any of those fired directly at a vested soldier will still penetrate the vest and injure the soldier.

Korean-era vests were seen in the early days of the Vietnam conflict, but the climate was so hot that unless your position was static or you flew in a helicopter where the breeze would keep you cool, they were not usually worn, even to obtain the real

protection they provided against artillery fragments. They were simply uncomfortable.

During this same time frame, new synthetics emerged that were stronger and lighter than nylon, the key one being Kevlar. It was a civilian who made the biggest impact in this area: Richard Davis of the Second Chance Body Armor Company. Davis designed the concealable ballistic vest to be worn on duty at all times by police officers. Because of the market Davis catered to, he needed a vest that was light, flexible, and capable of stopping the type of projectiles usually fired at police officers: low-velocity pistol rounds. His creation was a wonderful success and was followed by many imitators in the field, none as good. His vests are responsible for saving hundreds of police officers from death or injury and giving uncounted others peace of mind. Of course, through the years, the Davis vests got thinner, more flexible, and easier to wear concealed—all to the good—and the development continues.

The entrance hole of the 5.56x45mm (SS109) on a U.S. GI Kevlar helmet at 50 yards.



The exit hole caused by the 5.56x45mm (SS109) on the U.S. Kevlar helmet at 50 yards.

For the military man, however, such police-type vests really did little good. Unlike the police officer, the military man generally

The entrance hole on the U.S. Kevlar helmet caused by 9x19mm round (Czech steel-core penetrator) fired from a Beretta M9 at 50 feet.

Point of knife at exit hole caused by Czech 9x19mm ammunition fired at a U.S. Kevlar helmet at 50 feet with the Beretta M9 pistol.

knows when he will encounter his enemy so he may wear armor only when an attack is imminent; however, the military man's opponent is not firing a low-velocity missile at him, but rather a full-powered rifle round—frequently a round that is designed to penetrate armored objects, such as tanks or APCs. The military vest must be capable of stopping rifle-powered rounds, but because it does not need not be concealed, it can be bulkier. However, the head is still a problem area, and if rifle rounds can be prevented from striking the head, so much the better.

From these various demands came the Kevlar helmet and Kevlar combat ballistic vest. Fortunately, the U.S. forces (which got them first) have had little opportunity to engage in active combat in a major war since their adoption, but in the reports from the field in various low-level "conflicts" involving U.S. forces of the post-Vietnam era, the vests and helmets have been credited with saving soldiers from being injured. Whether the vests could really be worn over extended periods in tropical climates is a question in my mind. I know that I get short tempered and exhausted when I wear

concealable, soft body armor in the high humidity of August in St. Louis. I would imagine that wearing the current-issue ballistic vests on patrol in a tropical climate would have the same result.

The only way to truly determine how helmets and armor work is to try them out. Hearing third-hand reports about the efficiency of the armor is not sufficient in my judgment, nor do I suppose it is for the reader. Hence, I got a current-issue vest and helmet, and, despite my friends' horror, I shot them up, effectively destroying them, to test their effectiveness. As an interesting comparison, I also tested the helmets of the former East German army to see how the enemy's equipment rates (I did not have a Soviet ballistic vest, but I assume it is not as effective as its U.S. counterpart).

I am interested in how the equipment rates in a military environment, not a police situation, so I tested the following equipment and ammunition on the equipment at the ranges indicated:

Entrance hole in the Kevlar helmet caused by Czech 9x19mm (steel penetrator) ammunition fired from the Beretta M9 at 50 feet. Penetration can be seen on this side, but not on the other.

1. 9x18mm Makarov at 50 feet fired from RK 59
2. 9x19 NATO Ball at 50 feet fired from Beretta M9
3. 9x19mm Czech ball with steel penetrator at 50 feet fired from Beretta M9
4. .45 ACP U.S. ball round at 50 feet fired from Colt Government Model
5. 5.56x45mm NATO SS109 ammunition at 100 yards fired from M16A2
6. 5.56x45mm M193 at 100 yards fired from M16A1
7. 7.62x39mm Chinese steel core ammunition at 100 yards fired from AKM (Chinese-type 56)
8. 7.62x51 NATO ball at 100 yards fired from G3
9. 7.62x51 NATO with AP ammunition at 100 yards fired from G3

The results were as follows:

1. No penetration, helmet or vest
2. No penetration, helmet; penetration, vest
3. Complete penetration as well as exit on helmet; complete penetration as well as exit on vest
4. No penetration, helmet or vest
5. Complete penetration, helmet and vest
6. Complete penetration, helmet and vest
7. Complete penetration, helmet and vest
8. Complete penetration, helmet and vest
9. Complete penetration, helmet and vest

Is it worthwhile to wear a ballistic helmet and body armor? Do they change the equation on the battlefield? Against handgun rounds, they clearly make a difference, and efforts must be undertaken to adopt loads that will penetrate such material. Unless hysteria intervenes, this can be easily accomplished. With rifles, the problem is much less pressing because modern ammunition is still likely to penetrate anything that the typical soldier is likely to wear on the battlefield. Although such vests may stop an occasional ill-directed round, they are unlikely to do much good against a determined, accurate enemy. Thus, a soldier in the 21st century is likely to find himself in exactly the same position as that of the medieval knight who wore plate armor and faced a low-born archer or early musketman.

Important Features for the Military Rifle

After the evaluation of a substantial number of military rifles, it becomes obvious that some things are critical for a successful military rifle, others are useful, and still others are unnecessary. In this section are items that I consider either critical or worthy of note. I do not think that any military rifle available today is ideal, although some come very close, given the available technology.

RELIABILITY

Obviously, any military rifle must be reliable. It is far more important that a rifle is dependable in the military environment than in the hunting field. Additionally, there is simply no reason to accept anything less than a reliable weapon. Paul Mauser showed the way before the turn of the century, and certainly there is no reason to accept something less reliable than an M98 Mauser today.

DURABILITY

The rifle must be difficult to damage. Soldiers who are issued rifles do not care about them the way sportsmen who buy them do. Soldiers will drop them and allow them to crash into heavy equipment. Any rifle that cannot be dropped out of a helicopter at 100 feet onto a carrier's metal deck and remain intact does not meet the test. Rifles can have plastic or wood stocks and still meet this goal. Wood-stock rifles should have reinforcing strips in the grips as Japanese service rifles in World War II had (as well as fine English hunting rifles of the late 19th and early 20th centuries).

MAINTENANCE

Being able to clean a rifle quickly and efficiently in the field is important. Clean rifles shoot and function better. Any time you do not have the cleaning gear with the rifle there is a tendency to not clean the weapon. A butt trap containing oil, solvents, brushes, and a rod should exist on any rifle. The M14 is a perfect example of this type of system. Buttplates should be slightly checkered to prevent their slipping off the shoulder, but not so coarsely checkered as to cause the stock to stick in one place when mounting the stock. This, of course, if a very fine point and requires some experimentation.

STOCK

Whether a separate pistol grip stock or a more conventional stock is used may depend on the design of the weapon. Generally, a separate pistol grip stock allows better control of the weapon when held in one hand only, whereas traditional stocks seem to work better when rapid jump-type shooting is called for, as in jungles or thick woods. I would opt for the traditional style to get the quicker response time, but this may be more a reflection of my experiences than a purely military consideration.

Unless size is absolutely critical, such as

inside a tank or an APC, the fixed stock is always better than a folder. Not only are such fixed stocks more rigid, but, more important, the stocks are easier on the shooter's cheek and shoulder.

BARREL

Barrels on military rifles get hot, so they should be covered by a forearm both top and bottom that has either enough thickness to it to absorb a lot of heat before the barrel gets hot or has a heat deflector in it. Grabbing a rifle by the barrel can be painful after 20 or so rapid shots have been fired. The typical sporter stock usually lacks the top handguard.

TRIGGER GUARD

Military weapons are used in all types of weather. Unless a military is selecting a rifle that it knows will be used only in mild climates, the rifle should have a winter trigger guard so the shooter can use the weapon effectively in cold weather. A separate winter trigger, as existed for the M98 Mauser and M1-Garand, is not a good solution because such triggers are never there when you need them. And merely not having a trigger guard, as on the M60/62 Finnish rifle, is too dangerous for my tastes. A better option is the folding guard found on the M16 or SIG 550 rifles that folds down or to the side—or there is always the very large trigger guard that appeared on M98 Mausers used on the Eastern Front in World War II or appears on the Steyr AUG now. Although odd looking, their oversized trigger guard that easily accommodates gloved or mittened hands soon makes it a thing of beauty to the wintertime shooter trying to stay warm.

SIGHTS AND NIGHT VISION DEVICES

Much military action occurs at night. Certainly, with the advent of inexpensive night vision devices, the advantages of night operations have been somewhat compromised, but as one who has used these devices will admit, even the best are not as good as daylight. Therefore, night operations will continue to be standard for military units. The better the military unit, in fact, the more it operates in darkness. Control is always difficult in nighttime operations, but the benefits are so great that a truly effective military unit will conduct as many operations as possible in the dark. This means, of course, that the sights commonly encountered are ineffective because they cannot be seen. I can hardly see some sights on European military rifles in broad daylight, so shooting them at night is purely instinctive. With practice, I can hit a man-target at 100 yards that way, but I rather doubt the typical recruit could do as well. The consequence is a lot of shooting and little hitting. The way around this is to use glowing night sights. They are now available, and there is no reason not to have them—except for cost, of course. Despite their effectiveness, they are rarely encountered. Any military rifle should have glow-in-the-dark night sights that allow the shooter to properly align his weapon in the dark. For the cost of one fighter aircraft, you could put such sights on all the rifles in an army.

MAGAZINE

Any modern military rifle should use a detachable magazine. Stripper clips are fine for loading magazines, but a detachable magazine is far superior to a stripper clip guide. To avoid problems associated with the use of the low prone position, I would suggest a 20-round magazine, although a curved 30 is not too bad. In anything other than prone, the length makes no difference, even though magazines with more than a 20-shot capacity get rather heavy in 7.62x51mm NATO and larger caliber. A stripper clip guide integral to the receiver is handy in the event spare magazines are lost or as a way to load them in the field. However, guides should be attached to the stripper clips, as was done with M1 carbine ammunition to avoid this problem.

MAGAZINE RELEASE

Magazine releases should be usable from either side of the weapon without modification. At least 11 percent of the soldiers in a typical army will be left-handed. Centrally located magazine releases such as those found on the M14 and H&K G3 rifles are better than button types, which are really designed for right-handed shooters. I know that a left-handed person can use the latter rapidly if trained properly, but why require additional training if it can be avoided with proper ambidextrous design to begin with? Additionally, all soldiers should be taught to shoot off either shoulder, and such a magazine release will be easier to use when the weak-hand position is used.

SAFETY

Safety location is also a critical concern. Some safeties are so difficult to apply and remove that I tend to simply leave them off and use another method to ensure a safe carry. Any rifle should be capable of being carried in a safe fashion, but the shooter should also be able to rapidly flip off the safety and engage a target. A good test, I have found, is shooting flying clay targets. If you cannot put the rifle on safe (carried muzzle down), shoulder the weapon (taking the safety off), and then fire the weapon and hit your clay target before it gets out of range, it is unlikely you will be able to do so when an enemy soldier jumps up in the jungle 10 yards away and points his rifle at you. The latter was a common occurrence in Vietnam, and I am certain it occurs in battle anywhere dense jungle or woods exist. The safety should be easily disengaged when used by a left- or right-handed shooter and should not be vulnerable to being brushed off by vines, tree limbs, or contact with the body. Good examples are the centrally located M14 safety and the ambidextrous STG 90. Poor examples are the AK-47, the M91 Mosin-Nagant, and the M1903 Springfield.

FINISH

Finishes on military weapons that are subject to extreme wear and abuse should be the most modern possible. Stainless steel is an ideal material for all weapons that are to be used in the field, although standard steel covered by such coatings as tenifer or similar long-lasting protective material will work equally well. Clearly, a standard blued or parkerized finish is not sufficient. Barrels should be internally chrome plated to ensure a minimum of maintenance demands in hostile environments.

ACTION

The issue of action types is quite interesting. Typically, people think in terms of autoloading weapons for a modern military rifle. Unfortunately, these weapons tend to have the worst possible trigger pulls, and it is the trigger that makes the inherent accuracy in any rifle deliverable. An H&K G3 may be capable of hitting a quarter at 100 yards, but its trigger prevents such accuracy from being achieved. On the other hand, an M1917 Enfield that can shoot from a rest into 1 1/2 inches at that distance may actually shoot tighter groups than the H&K when both are fired by equally skilled shooters either from the off-hand or kneeling positions.

Ideally, the rifle should have an autoloading action that does not require the shooter's having to master the skill of bolt manipulation, but the time spent attempting to master the autoloader's trigger could be used to learn how to operate the bolt with better overall results. Shoulder-fired, full-automatic fire, except at extremely close range, is a waste of time and ammunition. Firepower is bullets hitting people, and you get that kind of firepower by shooting accurately, not by spraying the general area.

If the rifle has a trigger at least equal to that found on a good bolt action and still not double, then an autoloading rifle is fine. It can be done if care is taken, as evidenced by the SIG STG 90 rifle, but it is not cheap. It

requires high-quality material, design, and machining. If it is not possible, a good bolt action is better.

CARTRIDGE

The cartridge selected for a military rifle will frequently make or break the weapon. No rifle, no matter how accurate or dependable, is worth having if it will not stop an assailant. If it were otherwise, we all would be packing BB guns. They are easier and cheaper to shoot, they do not hurt your ears, and their ammo is light. Most of us gave up our BB guns for a real rifle or pistol because we did not merely want a gun, we wanted something that could kill our targets at a distance. Everything else takes second place to that requirement.

When determining what cartridge to select, we must decide what is required of the rifle. I suggest you review my comments in the chapter dealing with effective range for the rifle for an in-depth look at this subject. I have concluded that 300 meters is sufficient for most military purposes. This means that certain cartridges that are otherwise excellent must be discarded simply because they weigh more, are longer, have a recoil greater than others, and only are beneficial because of their greater ranging power, which is actually unnecessary for our military rifle. In this category are the 7.62x51mm NATO, .30 U.S., 7.92x57mm, 7.62x54R, and many others of that era. The trend we have seen develop since 1943 with the adoption of the 7.92x33mm, 7.62 x 39mm, 5.56x45mm, or 5.45x39mm also leaves a lot to be desired. They either have an excessively high trajectory at the outer limits of the 300-meter range or shed enough velocity at the extended ranges that they cannot be depended upon. No responsible deer hunter would shoot an animal at 300 yards with such loads, and I find it odd that they are considered suitable for a human—the most dangerous animal on earth (because only a human can inflict injuries from a distance). I do not believe we need to take bear cartridges to war, but we do need to take white-tail cartridges, at least.

Fortunately, this problem has been solved, but we tend to ignore the solution because it was found in either the hands of noncombatants or the losers: bullets need to be bigger than .22 but smaller than .30. They need a good ballistic coefficient if they are to be useful at longer ranges. The 6.5 caliber is known for its superior ballistic coefficient.

The bullet needs to burn enough powder to push it fast enough to remain damaging at 300 meters yet not so much as to produce excessively high recoil. To do this, we need a case big enough to hold the powder yet small enough to be used in short, light actions. Such cartridges do exist in the shape of 6.5x54mm, 6.5x55mm, 6.5mm Japanese, and 6.5mm Italian. All of these loads have been underappreciated because they are used in odd weapons. However, the bullets are big enough that such specialty rounds as tracer, armor-piercing, and incendiary can be produced, and they will retain their velocity because their superior ballistic coefficient is much better than that of smaller rounds. The lighter bullet weight and moderate velocity reduce recoil and blast.

In short, the modern military rifle needs to be in a caliber that makes it truly effective in its role.

SUMMARY

Today, numerous rifles have many of these desirable features, but none has all. With the recent outburst of peace in the world, such things as military rifles will get low priority for development, which is unfortunate. The cost of developing one airplane would more than pay for the development of a better military rifle and its introduction into a military organization. The enemy may no longer be the Soviet Union, but out there someplace is a new enemy, which may be as yet unknown but still exists. Swords should not be beaten into plowshares just yet; as has been said before, "Only the dead have seen the end of war."

Getting Ready for Action

One purpose of this series is to evaluate combat weapons that many of you will never have an opportunity to shoot, but if you do encounter such a weapon in some distant place where it may be the only weapon available and you have a limited opportunity to try it out, you will know what to expect of it.

If you come across one of the tested weapons in a deserted weapons dump, in a bazaar, or at the home of a woman whose husband brought it home from one of the world's many wars as either his service rifle or a souvenir, you need to know what to do to ensure that it will give you the performance you demand of it. Certainly, the worst of the rifles tested, perhaps the Springfield M1873 Trapdoor rifle, is far better than a club.

As with any weapon, check to see that it is unloaded. A surprising number of old rifles are put away loaded. Frequently, when tested with the ammunition left in them, they fire without hesitation. I recall a World War I Mauser rifle I came across that was cocked, loaded, and with the safety off, and had probably been that way for well over 75 years at the time. When tested on the range, it immediately fired. The old veteran was ready to speak without any hesitation. I have heard similar tales of U.S. Civil War-era muzzle loaders, so check first to see that the weapon is unloaded.

Next, make certain you know what cartridge the weapon is chambered for because many military rifles are not marked for caliber. Also, many have been rechambered over the years. You may get away with using the wrong ammunition in a handgun, which is held away from your face, but the higher pressures with rifle cartridges, which are right in front of your face, are not as forgiving.

Typically, when you read articles about old rifles, the author says to take the weapon to a gunsmith to check it out. This is good advice normally, but in the circumstances envisioned, it is not very practical. You must be able to check the weapon out yourself. After determining that the weapon is unloaded and what cartridge it is chambered for, check the bore. Frequently it will be pitted and rusted. There is nothing much you can do about that, but I have seen insect nests built in rifle bores. What is called for here is a good cleaning. If you are missing the normal cleaning equipment, use screen wire and hot water and soap, but get the accumulation of filth of 50 or more years out of the bore. Next check the bolt. Clean out the grease and dirt by disassembling the bolt. A slight amount of oil on critical moving parts is enough. I suggest that you not remove the action from the stock. The metal in the wood might be rusted, and although it will not affect the shooting of the rifle, it may adversely affect the bedding of the rifle. Why risk it for no good cause? Check firing pin protrusion. Make certain the pin is long enough yet rounded, not pointed. I have seen rifles where the tip had been cut off in an attempt to prevent the weapon from firing (probably by a

mother who did not want her young son to fire his father's captured rifle).

Check the action for functioning by running a few rounds through the weapon. Keep your fingers clear of the trigger when you do this and keep the weapon pointed in a safe direction in case something does not work properly. I suggest you do this first with the rifle empty and test all safeties with an empty rifle as well. If you have dummy rounds to test functioning, naturally, you should use them; but I assume that most times you will not have such ammunition. Make certain the ammunition you load in the weapon is the same as what the rifle is chambered for. If the ammunition comes from a box, you may not be able to read it, depending on the language it is written in on the label. Unless you know why a certain round has some special paint on the head or around the primer, go to the next round; painted rounds may be proof loads, tracer, or incendiary rounds, and shooting these inside your home is not an experience to be repeated.

If the weapon appears to function properly and you have the proper ammunition for it (remembering that you can make ammunition from other cartridges), you must test the rifle. Obviously the best way to do this is to go to a place where the range is safe. Then place the rifle in some type of rest where the recoil will not cause the rifle to hit a hard object and break a stock. Fire a round by remote control by using a string or rope. Examine the action for signs of overpressure. Work the action to make certain the empty cartridge can be easily withdrawn. Then check the fired case for a cracked neck or stretch marks, and check the primer pocket for blowback, cratered pockets, or other signs of overpressure. Next, fire a few rounds at a target to determine proper calibration of sights. I suggest you start close and see where the weapon hits at 25 meters before trying it at any long ranges.

Most likely in this typical scenario, you will not be able to benefit from firing several rounds because firing rifles will alert people to your being armed. Unlike handguns, rifles are typically loud; it is too difficult to conceal the fact that they are fired repeatedly. My observation is, however, that you can usually get at least one round off without people figuring it out. Unless people are listening for a round fired, one shot is not likely to alert them. If they do not hear a second shot, they are likely to think that it was something else (such as an automobile backfiring) or that they imagined it; even if they are sure that it was a rifle firing, they are unlikely to be able to pinpoint the location. The best time to shoot is either when a large truck or train is going by or, alternatively, at 3:00 A.M. when most people are asleep. Being awakened from a sound sleep and hearing nothing else thereafter, most people will think it was a dream. They are unlikely to call the authorities and report something that may have been only a dream.

Now, you know that the weapon functions and that the ammunition you are using works. You have fired rounds through the action and looked at each cartridge for signs of corrosion or other obvious defects. Now it is time find out where your rifle actually shoots. It is a rare rifle that hits exactly where the sights are set for, and you also have no way of knowing where the rifle has been in the past several decades, how many times it has been dropped, whether the stock has gotten wet and swollen, or any of the other things that will affect the POI. Many people go into combat not knowing where their rifles shoot and thereby risk their lives foolishly. It is better to have only a few rounds to carry in combat and use the other rounds to determine zero than to have more rounds to fire from an unzeroed rifle. Time spent sighting in is always time well rewarded in combat. Further, unlike with handguns where the targets are likely to be close, rifle targets are likely to be far away.

If a formal rifle range or a place where you can shoot without alarming anyone is available, use it. But if not, you still must try the weapon out. Absent a long building or tunnel to fire in,

I suggest you build a muffler for your rifle. A few garbage cans filled with fiberglass or even bedding or sleeping bags will suffice. Tape them inside the can and fire through the tunnel created, leaving enough room to insert your barrel and still see your sights. Try the weapon from at least 50 yards out, though it is better from about 300 yards. Keep your target so you can analyze it at your leisure. Do not forget that you are shooting a rifle, and make certain a suitable backstop is used. A large tree or stump will work if it is at least 30 inches in width. Full-power military ammunition will go through a surprising amount of wood.

Even when you have done all of the things mentioned, bear in mind that you are using old ammunition stored under who knows what circumstances and shooting a weapon whose sights may well be off or with a bore long neglected, pitted, or rusted. As the elephant hunters of old used to say, "Get as close as you can, sonny, then get 10 yards closer." Or as the brave commander at the Battle of Bunker Hill said when American troops faced British oppressors who sought to limit their ability to own weapons, speak and write freely, and control their own lives: "Don't fire until you can see the whites of their eyes." This is good advice today when firing a rifle with sights that may not be properly calibrated for you or with ammunition that may have been made before the grandfathers of the soldiers you face were born.

Summary, Conclusions, and What Was Learned

Our survey of rifles, sniper rifles, and light machine guns has taken us from a time when U.S. soldiers fought the great Indian nations of the Plains to the present, when the latest in weaponcraft is being used to fight foes armed by the best that communism could supply them. I hope it has been as much fun for the readers to take this trip as it has been for me to be the guide.

It has been quite a challenge to assemble the weapons, and a not inconsiderable expense has gone into obtaining them and the ammunition to shoot in them. Resources have been tapped literally all over the globe to supply the material presented here. I fully realize that I have omitted a few weapons, possibly your favorite, but I do not believe that I have omitted too many of the most critical weapons and have included many that are relatively obscure. If your favorite was not included, it is probably because I was unable to locate an example. If you have one that I have left out, write to me in care of my publishers, and I will arrange to test it so it may be included in a future volume.

I do believe that I have now tested more individual weapons than anyone else and that this gives me some basis for making intelligent comments about the weapons. I realize that we all approach things from our own viewpoint and that we bring our own prejudices to the process. I admit that I bring the prejudices of a company-grade, U.S.-trained infantry officer, who got his initial military training during the Vietnam War period. I tend to view things from the standpoint of infantry patrols, where you walk long distances with minimal support and are basically on your own if the enemy is encountered.

Perhaps if my background had been different, say an ordnance officer or professional engineer, I would approach the subject differently. Maybe I would be concerned about the type of system used or the method by which the weapon was manufactured. But, frankly, I do not care about such things. My only concern is how the weapon operates when used as an instrument designed to kill human beings who are attempting to kill you. Is it easy to operate when I am tired? Does it work when the temperature is hot or cold? Can it be conveniently carried so it is readily available if I stumble upon the enemy? Can it be rapidly reloaded if shot empty? Will it work if I drop it in a mud hole, swim across a river with it, or walk behind a tank moving in dusty terrain for hours on end? I really do not care why it works, how much it costs to make, where it was designed or made, or anything of that type—only if I can carry it all day for weeks on end, and when I put it into action, if can I do so rapidly and efficiently. If I do my part in aiming, will it hit the target and, if so, will it knock my opponent on his butt? That is what I want to know, and I think it what readers will want to know as well. This is the way I have approached my evaluation of the weapons.

When reviewing such an evaluation as this, the following questions always come up: What is the best and the worst rifle, and what are the most surprising things you discovered? Taking the last point first, I would say the six most surprising things discovered by me during the course of my research are as follows.

SURPRISE

1. *Straight-pull rifles, such as the Swiss M11 and K31 and Steyr M95, are very fast and efficient.* I had never used them seriously and mistakenly believed that they were slow, awkward Central European designs not really suitable for a serious rifleman. They are wonderful actions suitable for the most sophisticated shooter. The Austrians may have lost World War I and the Swiss never fought a modern war, but it was not because of the rifles in the first instance and it was in part because of their rifles in the second instance. I think so much of straight pulls now that the next "combat sporter" I build will be based on such an action. They are simply great!
2. *Learning how to remove the safeties properly on both the Japanese and Italian service rifles is critical to their operation.* Previously these safeties had always seemed slow and awkward, but when I started using their rifles as combat weapons and not bench-rest target punches, I learned how to properly use these safeties. Done properly, they can be disengaged promptly, are sturdy, and can be reengaged without difficulty. On both rifles, I could easily hold them at the ready position with the safety on, call "pull," flip the rifle to my shoulder (pushing the safety off as I went), and shoot a flying clay bird with the rifle if I did my part. Any safety that works that efficiently is a very fine design in my book. Try doing that with a Mauser-style safety someday and see if you can do the same before you criticize my position here.
3. *Realizing that World War I rifles were nearly all sighted for a minimum distance and that, because of the nature of trench warfare, most of the shots fired in World War I likely went considerably over the heads of the intended victims were real surprises for me.* Looking at such rifles, I always realized that the sights were graduated for very long ranges, but until you put the sight on the lowest setting and attempt a 100-yard group, you really do not realize what the consequences of such graduations are for the soldier in the field.

   As an aside on this sight issue, after years of thinking such long-range sights were foolish, I finally came to realize that they met a real-life need when indirect-fire weapons and platoon-level machine guns were not available. By using such sights with high-trajectory ammunition, unit firing practices, and a spotter, it is possible to rain bullets down on a distant enemy who might well be over or behind a hill. Thus, the rifles fired in unison with others in a military formation under the direction of a properly trained NCO or officer can substitute for a mortar or machine gun. I was not trained to view rifles in this way because we had mortars and light machine guns when I was in the service. But it is useful knowledge for the civilian militia member or irregular warrior who may not have such weapons available but who does have access to such old-time bolt-action or single-shot rifles.
4. *The importance of good sights and trigger pulls was reinforced by my work on this book.* Good trigger pulls are critical to the ability to deliver an aimed shot at the proper time. The double-stage military trigger pull does not preclude that from occurring: you simply pull up and through the first portion of the pull and then concentrate on the last half of the pull. The two-stage pull does, however, prevent the weapon from jarring off when the bolt is worked rapidly, something that will occur with commercial sporting rifles and

their single-pull triggers. But a double-stage trigger pull does not have to be heavy or creepy with lots of overtravel. It can be 4 to 6 pounds and break cleanly. I can manage such a trigger pull quite well for off-hand or kneeling work, and anything that is acceptable for those positions will work fine in the prone or sitting positions. Most World War I-era rifles have trigger pulls that are far superior to those found on such rifles as the H&K G3 or the constantly shifting three-shot burst trigger group on the M16A2 rifle.

The importance of sights cannot be overlooked, and the typical European pyramid front and V- or U-notch rears are simply unacceptable for my nearsighted eyes. Combat rifles should have a well-protected blade-type front sight (preferably not black but some contrasting color) coupled with a peep sight that is located close to the eye, so that the blade front is automatically centered. For example, the sights on the Pattern 14 Enfield are excellent, as are the sights on the M1/2 carbine. The worst offenders are the deep-notch rear units and pyramid fronts found on some variations of the M91 Italian Carcano rifles, although the U.S. rifle M1873, M1896, and M1903 are very close behind.

In this regard, the current trend toward the general use of the telescopic sight on battle rifles deserves to be watched. If the manufacturers can design scopes that are soldierproofed both from the standpoint of being durable and of keeping the soldier from fiddling with the adjustments, such units should allow much better performance in the field. Unfortunately, these units are now placed on rifles that have terrible trigger pulls, in contrast to those of 1914. If such sighting units as the SUSIT, the Elcan, and those on the AUG prove durable, then they could be mounted on a rifle with a proper trigger pull, and they might prove to be the best. However, since the manufacturers have not been able to make a scope "cop-proof" and the trainers cannot convince either soldiers or cops to leave adjustable sights alone, I have my reservations about this.

5. *Discovering how the Remington Rolling Block was actually designed to be operated as a combat weapon was eye opening and made me feel like some explorer who had stumbled upon a lost civilization.* Why exactly no one ever writes about the technique is a mystery to me. As noted earlier, I suppose it was because the men who carried those rifles in battle were for the most part non-English speakers, typically illiterate, and died long ago.
6. *Although I had learned as early as 1963 that shoulder-fired full-auto rifle fire was ineffective—with the first round hitting the POI and the rest of the rounds going higher and higher—my research confirmed my judgment (and that of Melvin Johnson as well) that fast semiautomatic fire is preferable full-out fire.* None of the rifles tested that offered selective fire were as effective (even at very close range) on full auto as they were when fired in fast semiautomatic.

   However, I also discovered that bolt-action rifles can be shot very rapidly and that a well-designed bolt action with a good trigger and with an extended-box magazine actually is as good as a semiauto rifle, such as the H&K M91 with its poor sights and trigger pull. If you take both examples and run them over similar courses of fire from any of the firing positions, the box-fed bolt-action (in this case the M700 Remington with an M14 magazine) will be better than the H&K M91/G3 rifle. Perhaps the proper service rifle is a straight bolt-action rifle fitted with a durable SUSIT, Elcan, or AUG-type sight and a box magazine holding 20 rounds of bigger than 5.56x45mm but smaller than .30-06 ammunition. I know my M700 fitted with a box magazine and Leupold 1.5X5 scope would be my first pick if I had to grab a rifle for a battle

today. Although I also really like the AR-15A2 equipped with an Elcan.

BEST RIFLES

The best weapons I tested should be broken down into time periods, although they overlap to a degree.

1. The Pattern 14 or M1917 Enfield is the best World War I-era battle rifle. It has excellent sights and a good safety and trigger. Perhaps it is a bit too long, but otherwise it is excellent.
2. The K31 is most likely the finest straight-pull service rifle ever made. It has a wonderful action and good trigger, and is limited only by its capacity and sights. Suitably modified, such as an action might well prove to be an ideal military rifle.
3. The M91 Italian Carcano carbine with fixed sights was the most surprising of the weapons fired. I had always thought of these rifles as cheap wartime emergency weapons, but instead they are light, handy, and easy to shoot with great combat sights. It is the best rifle fielded by the Italians during the war and much better than any other bolt-action rifle used in the two world wars by the combatants—except as noted earlier with the Pattern 14/M1917 Enfield.
4. The M1 carbine is a seriously underestimated weapon. Calling it a carbine clouded its identity because people tended to think of it as a small version of the M1 service rifle, which was the old definition of a carbine. But the M1 carbine was a new weapon system because it brought a limited-range, lightweight cartridge to the battlefield for the first time. It preceded the 7.92x33mm assault rifle cartridge of the Germans and the 7.62x39mm cartridge of the Soviets. It is only a few hundred feet slower than either, and yet it is a handy 5 1/2-pound package with excellent sights. The German and Soviet rifles weigh almost twice as much and have much poorer sights. Although many sneer at the M1, experienced infantry types such as Lieutenant Colonel George—who was both an experienced prewar rifleman and World War II infantryman, who served with Merrill's Marauders in Burma—selected it to carry with him in the jungle. I know it would have been my favorite, especially if loaded with tracer ammunition, which I know offers good stopping power on human targets. It is lightweight, short, and handy; has great sights and an excellent safety and magazine release; and used noncorrosive ammunition when it was uncommon. I believe it was the best rifle available in World War II and a most underrated and unappreciated weapon—except for those who carried the weapons in combat.
5. The best weapon I tested was the SIG 550 (STG 90). It contains all the good features that have been adopted for many rifles over time. It is truly a fine weapon within the limits of the 5.56x4 mm "heavy bullet" cartridge. Were I to be tasked with the job of selecting a 5.56x45mm rifle, the SIG 550 is the one I would select. It is truly superior to anything else on the market.

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Over the past 130 or so years, much effort, energy, and money have gone into developing suitable infantry weapons. It was a truly revolutionary step to go from the percussion musket of 1860, with which (to a great extent) the U.S. Civil War was fought, to the cartridge repeater of smokeless powder M1886 rifle adopted in France. I do not think the development from that time to now has been nearly as great. The infantryman of World War I was not so poorly armed as might be expected at first glance. Certainly infantrymen have not had as much development directed in their direction as have aviators. If we look at aerial developments from 1903 to date and compare them with infantry small-arms

developments during the same period, it is clear that there have been few real advances in the latter field. It is still individual ability, inclination, and bravery that will carry the day in small-arms warfare, not the type of weapon used. The World War I pilot in his biplane would be no match for the F-18 pilot, but the Pattern 14 Enfield-equipped soldier may very well easily kill the soldier of the late 1990s armed with an M16A2 rifle. Certainly, the fighters in Afghanistan showed that their Enfields were equal to Soviet AK-74 rifles—and served as an example for all of us who are confronted by oppressive governments that seek to limit our ability to acquire current-issue military weapons.

Imagine an encyclopedia of war weapons that contains all the critical details about more than 150 of the best, worst, most common, and most surprising rifles, sniper rifles, and light machine guns of the 20th century. Well, imagine no more—this reference work exists. It is *Testing the War Weapons: Rifles and Light Machine Guns from Around the World.*

The author, Timothy J. Mullin, an infantry officer with the U.S. Army, knows what makes a good battle rifle. He personally tested each one of these weapons to determine how they would perform in actual combat, whether in the trenches of France, the jungles of Vietnam, or the deserts of Kuwait. The weapons tested are from 32 countries and include everything from the M93 Spanish Mauser, which killed a lot of Americans in the Spanish-American War, to the French FAMAS and British SA-80, two bullpups that saw action in the Persian Gulf and Bosnia.

This grunt's-eye view of war weapons is sure to become a standard reference for professionals in ordnance, intelligence, infantry, or special operations, as well as for people who are interested in firearms history and development or just want to know how reliable and accurate a specific rifle is.

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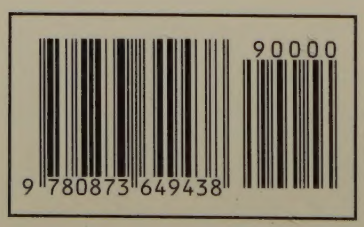

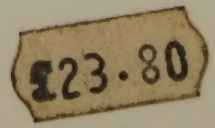

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